ETUGIN
TL
501
.S42

IE 23 / NUMBER 16
ST 23, 1985
OS. N85-26610 TO N85-27820

STAR

AN ABSTRACT JOURNAL

THE UNIVERSITY
OF MICHIGAN
AUG 29 1985
ENGINEERING
LIBRARY

Scientific and Technical Aerospace Reports

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 23, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by RMS Associates.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through March 22, 1988.

US ISSN 0036-8741

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

THE UNIVERSITY OF MICHIGAN
AUG 29 1985
ENGINEERING LIBRARY

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU topic categories can be obtained from ESDU International Ltd. Requesters in North America should use the Virginia address while all other requesters should use the London address, both of which are on page vi.

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC: NASA and NASA-sponsored documents and a large number of aerospace publications are available to the public for reference purposes at the library maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN: An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in *Star*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols # and * from ESA - Information Retrieval Service European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

FEDERAL DEPOSITORY LIBRARY PROGRAM

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 50 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. Over 1,300 other depositories also exist. A list of the regional GPO libraries appears on the inside back cover of *STAR*.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International, Ltd.
1495 Chain Bridge Road
McLean, Virginia 22101

ESDU International, Ltd.
251-259 Regent Street
London, W1R 7AD, England

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NIT-1)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	-1	-2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	35.00	45.00

VOLUME 23 NUMBER 16 / AUGUST 23, 1985

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 2691

02 AERODYNAMICS 2699

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 2702

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 2704

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications*.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 2705

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

06 AIRCRAFT INSTRUMENTATION 2707

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 AIRCRAFT PROPULSION AND POWER 2708

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

08 AIRCRAFT STABILITY AND CONTROL 2710

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 2715

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space)*.

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 2716

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

13 ASTRODYNAMICS 2727

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 2728

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air)*.

15 LAUNCH VEHICLES AND SPACE VEHICLES 2728

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 2729

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING 2729

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 2730

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

19 SPACECRAFT INSTRUMENTATION 2732

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

20 SPACECRAFT PROPULSION AND POWER 2733

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 2742
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 2742
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 2744
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 2748
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 2753
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 2756
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) 2758
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 2768
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 2777
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 2781
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 2786
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 2789
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 2792
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 2796
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 2796
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) 2804

43 EARTH RESOURCES 2806
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 2817
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 2821
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 2823
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 2829
Includes weather forecasting and modification.

48 OCEANOGRAPHY 2838
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) 2839
Includes genetics.

52 AEROSPACE MEDICINE 2840
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES 2843
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT 2844
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY N.A.
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) N.A.

60 COMPUTER OPERATIONS AND HARDWARE 2844
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE 2845
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS 2849
Includes computer networks.

63 CYBERNETICS 2851
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS 2852
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY 2857
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS 2858
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS 2858
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) 2859
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS 2860
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS 2861
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS 2864
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS 2864
Includes light phenomena.

75 PLASMA PHYSICS 2866
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS 2869
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS 2872
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) N.A.
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT 2873
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE 2877
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS N.A.
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE 2879
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION 2880
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) N.A.

89 ASTRONOMY 2880
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS 2881
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION 2883
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS 2884
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION N.A.
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

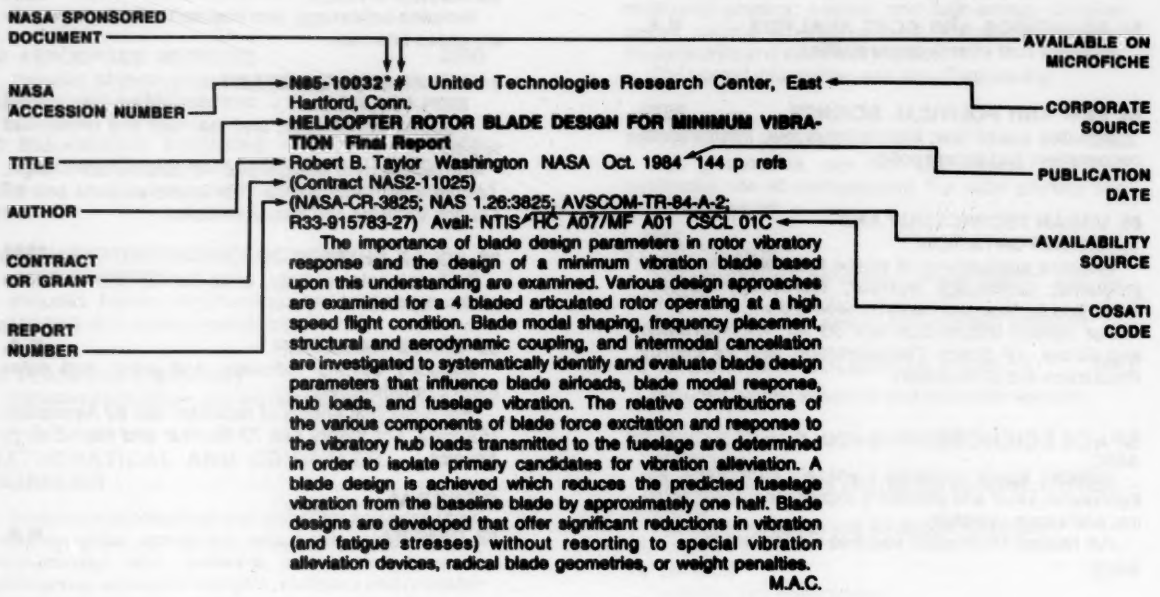
GENERAL

99 GENERAL N.A.

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX I-1
PERSONAL AUTHOR INDEX I-67
CORPORATE SOURCE INDEX I-77
CONTRACT NUMBER INDEX I-93
REPORT / ACCESSION NUMBER INDEX I-95

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N85-10032*# United Technologies Research Center, East Hartford, Conn.
CORPORATE SOURCE
TITLE
HELICOPTER ROTOR BLADE DESIGN FOR MINIMUM VIBRATION Final Report
PUBLICATION DATE
AUTHOR
Robert B. Taylor Washington NASA Oct. 1984 144 p refs
CONTRACT OR GRANT
(Contract NAS2-11025)
REPORT NUMBER
(NASA-CR-3825; NAS 1.26:3825; AVSCOM-TR-84-A-2; R33-915783-27) Avail: NTIS HC A07/MF A01 CSCL 01C
AVAILABILITY SOURCE
COSATI CODE
The importance of blade design parameters in rotor vibratory response and the design of a minimum vibration blade based upon this understanding are examined. Various design approaches are examined for a 4 bladed articulated rotor operating at a high speed flight condition. Blade modal shaping, frequency placement, structural and aerodynamic coupling, and intermodal cancellation are investigated to systematically identify and evaluate blade design parameters that influence blade airloads, blade modal response, hub loads, and fuselage vibration. The relative contributions of the various components of blade force excitation and response to the vibratory hub loads transmitted to the fuselage are determined in order to isolate primary candidates for vibration alleviation. A blade design is achieved which reduces the predicted fuselage vibration from the baseline blade by approximately one half. Blade designs are developed that offer significant reductions in vibration (and fatigue stresses) without resorting to special vibration alleviation devices, radical blade geometries, or weight penalties.
M.A.C.

VOLUME 23 NUMBER 16 / AUGUST 23, 1985

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N85-26610*# National Academy of Sciences - National Research Council, Washington, D. C. Commission on Engineering and Technical Systems.
[ACTIVITIES OF THE AERONAUTICS AND SPACE ENGINEERING BOARD] Summary Report, 1 Jan. - 31 Mar. 1985
Apr. 1985 13 p
(Contracts NASw-4003; NASw-3455)
(NASA-CR-175825; NAS 1.26:175825) Avail: NTIS HC A02/MF A01 CSCL 01B

A summary of activities of the Aeronautics and Space Engineering Board for the period January 1, 1985 to March 31, 1985 is given. Information is given on Space Technology Research activities. R.J.F.

N85-26611# National Aerospace Lab., Tokyo (Japan).
PROCEEDINGS OF THE NAL SYMPOSIUM ON AIRCRAFT COMPUTATIONAL AERODYNAMICS
1983 216 p refs In JAPANESE and ENGLISH Symp. held in Tokyo, 30 Jun. - 1 Jul. 1983
(NAL-SP-1; ISSN-0289-260X) Avail: NTIS HC A10/MF A01

Papers from the National Aerospace Laboratory Symposium proceedings on Aircraft computational aerodynamics are presented. New advances in computer techniques in this area are highlighted. Numerical methods best suited for solving aircraft computational problems involving potential flow, cascade flow, separated flow and inviscid flow are discussed, in detail. For individual titles, see N85-26612 through N85-26632.

N85-26612# Tokyo Univ. (Japan). Inst. of Space and Astronautical Science.
PROGRESS OF COMPUTATIONAL FLUID DYNAMICS IN THE WORLD **c34**
Koichi Oshima *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 1-6 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

Firstly, a thermal design method of spacecraft using thermal nodal analysis is briefly reviewed. In this method thermal nodal points are assigned to several representative points of the spacecraft and the thermal balance equations for each nodal point are simultaneously solved. The thermal conductance between the nodal points is corrected using the physical simulation data and the flight data. Secondly, a vortex method in computational fluid dynamics, re-classified as a mathematical model, is described. In this method the conservation equation of vorticity fixed to the fluid mass elements serves as the basic equation. The creation of the vorticity is phenomenologically modelled, and the decay is taken into account through numerical dissipation and/or decay of the viscous core. The usefulness of this concept is demonstrated by the unsteady flow field around a rotating elliptic cylinder simulated by this method, which could predict the existence of wake oscillation unrelated to the body oscillation. Thirdly, the self-similarity of flow fields is discussed. B.W.

N85-26613# National Aerospace Lab., Tokyo (Japan).
COMPUTER SOFTWARE FOR AERODYNAMIC DESIGN OF AIRCRAFT DEVELOPED WITHIN THE NATIONAL AEROSPACE LABORATORY **c02**
Hiroshi Endo *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 7-16 refs In JAPANESE (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

A computer was first introduced to the National Aerospace Laboratory in 1960. Subsequent introduction of increasingly more sophisticated models played important roles in the active research conducted by the laboratory. Acquisition of FACOM 230-75AP, the first vector computer in Japan, resulted in the start of software designing for full utilization of a large, ultra-high speed computer. The analytical programs developed by the laboratory include FLOW, PNCCP, TSFOIL, AFMESH, NSFOIL, SPWING, and AFPWING, while notable design programs are TSFD, INVERSE, SPWD, and BLAY. In designing these softwares, the laboratory is aware of importance of organizing joint projects to avoid unnecessary expenditures and waste of manpower, confirmation of reliability of each program, systematization of data bases, and publication of these programs for the general interest. A computer specially designed for statistical simulation of a wind tunnel is described. With the completion of the next generation numerical simulator, such a computer wind tunnel system is expected to play an important role in aircraft technology in Japan. Transl. by B.G.

N85-26614# National Aerospace Lab., Tokyo (Japan).
AN APPROXIMATION THEORY FOR NONLINEAR EVOLUTION EQUATIONS AND SINGLE CONSERVATION LAWS **c64**
Tadayasu Takahashi and Toshiyuki Iwamiya *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 17-23 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

An approximation theory for nonlinear evolution equations is discussed in relation to the Lax equivalence theorem for linear problems. This theory is applied to scalar conservation laws in several space variables. It follows that Boltzmann type approximations as well as finite difference approximations converge to the physical weak solution which satisfies the entropy condition. Author

N85-26615# Fujitsu Ltd., Tokyo (Japan).
RECENT TRENDS IN SOFTWARE TECHNOLOGY FOR VECTOR PROCESSORS **c61**
Yoshiyuki Tanakura and Sachio Kamiya *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 25-36 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

To use a vector processor efficiently, the most important point

is to increase the vector processing ratio of a problem. But, through the process of coding the problem, it is usual to decrease the parallelism of the problem. And the lost parallelism cannot be restored to the former level. The reason for this fact is that the parallelism of the problem depends largely on the algorithm and programming language used. This paper describes the process of coding and the cause of the decreasing parallelism. The selection of the programming language is the key point in the effective use of vector processors. Various kinds of language systems have been developed and are used for vector processors. Most of these language systems are based on standard FORTRAN, since FORTRAN is the main programming language used in the scientific and engineering fields. The characteristics of these language systems are discussed. B.W.

N85-26616# Tokyo Univ. (Japan). Inst. of Space and Astronautical Sciences.

SOME NUMERICAL ANALYSES OF FLOWS WITH SEPARATION c34

Kunio Kuwahara *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 37-42 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

Computational study of high Reynolds number flow with large separation is the most important problem now in computational aerodynamics. Some examples of recent results of studies of such flows are presented. The methods used are finite-difference methods and vortex methods. The first example is that of an incompressible flow past two cylinders computed by the finite-difference method based on a stream function-vorticity formulation of the Navier-Stokes equations. It is pointed out that special care must be taken to determine the boundary values of the stream function on the bodies when using this method. The second example is that of an incompressible flow past a circular cylinder at a critical Reynolds number computed by the MAC method using an improved upwind difference. The sharp drag reduction is first captured numerically by this computation. Third is an example of the simplest version of the new vortex methods without conformal mapping, which enables us to compute incompressible flows with large separation very easily and economically. The last example is of a transonic flow past an oscillating airfoil computed by the Beam-Warming scheme. B.W.

N85-26617# Tohoku Univ., Sendai (Japan).

TWO COMPUTATIONAL METHODS FOR CASCADE FLOWS c34

Hisaaki Daiguji *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 43-53 refs In JAPANESE (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

The author describes two methods of numerical analysis of the flow from the runner of a turbomachinery. In the first, a finite element method (FEM) is applied for the analysis of stationary three-dimensional potential flow. In the second, the solution is derived from the FEM of non-stationary two-dimensional flow on the rotationary flow surface and separated vortex method. Each method is illustrated by equations, statistical computations, flow charts, and drawings describing cascade flow. Transl. by B.G.

N85-26618# Ishikawajima-Harima Heavy Industries Co. Ltd., Tokyo (Japan).

NUMERICAL ANALYSES IN AERODYNAMIC DESIGN OF AERO-ENGINE FAN c07

Susumu Nagano *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 55-62 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

A brief review is presented of the current status of numerical methods for aero-engine fan internal flow analyses used in the design stage. The following four topics are discussed: (1) meridional flow analysis; (2) transonic cascade flow analysis; (3) supercritical cascade design analysis; (4) Three dimensional blade-to-blade analysis; and (5) circumferential pressure distribution analysis. The streamline curvature method has been most widely used in meridional flow analysis. For the fan rotor outer region where the total pressure losses associated with shock waves play an important role, 2-D shock-capturing Euler codes are relevant, and schemes such as MacCormack's or Denton's are commonly built into standard design procedures. Supercritical airfoil technology developed for aircraft wings finds application in the cascade design. Both inverse method, such as the Bauer-Garabedian-Korn method using complex potentials, and direct methods with transonic potential analysis are utilized in this application. Three dimensional Euler codes are used to check the 3-D effects within blade-to-blade passage. The singularity distribution method with compressibility correction has proved useful for assessing the circumferential pressure distribution induced by downstream obstacles. B.W.

N85-26619# National Aerospace Lab., Tokyo (Japan).

NUMERICAL SIMULATION OF INVISCID COMPRESSIBLE FLOW THROUGH THREE-DIMENSIONAL CASCADE c34

Masahiro Fukuda *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 63-70 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

The steady inviscid compressible flow through a three-dimensional cascade is computed by Denton's original Time-Dependent Finite Volume Method. The present paper is concerned with the numerical results obtained during the course of development, adopting the RD-blade(2) for a test case. Two types of evaluation of flux vector through up and down stream surface of the integral domain are compared. In the steady state, the computed Mach number shows good agreement with the experimental isentropic one, except near both leading and trailing edges on the suction surface, although computed isentropic Mach numbers differ somewhat from those obtained in experiments on the fore part of the compression surface. This is caused by computed total pressure variation resulting from low static pressure on the compression surface. In the case of the two-dimensional computations based on McDonald's Finite Area Method, such difference resulted from somewhat inaccurate density. In the three-dimensional case, it is expected that this approach is also applicable to overcome present difficulties. B.W.

N85-26620# National Aerospace Lab., Tokyo (Japan).

A NUMERICAL PROCEDURE ON THREE-DIMENSIONAL PARABOLIC FLOW IN DUCT c34

Atsuhiro Tamura and Kazuo Kikuchi *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 71-81 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

A numerical procedure for solving the three dimensional viscous flow in a duct is described in this paper. The governing equations are parabolized according to boundary layer approximation such that the derivatives concerning physical quantities along the main flow direction are much smaller than those in the secondary flow direction. No assumption such as uncoupling of the longitudinal and cross flow pressure gradients is made for the pressure field. And also relaxed continuity equation is used, which allows constant source distributions in the radial direction. Assumed wall pressures are corrected by the Newton-Raphson method so as to reduce the source distributions to zero. Example calculations of the three dimensional flow field in a curved annulus and curved pipe are carried out. Typical secondary flow patterns are obtained for either case. Author

N85-26621# National Aerospace Lab., Tokyo (Japan).

APPLICATION OF CONFORMAL MAPPING TO GRID GENERATION c64

Kenji Inoue and Takashi Nakamura *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 83-90 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

The general principle for numerical conformal mapping is stated, i.e., the mapping function is supposed to be the sum of a known principle term and an unknown correction term. The former gives the zeroth approximation and the latter is so determined that the desired mapping is obtained. Examples are shown for the configurations of periodic simply connected regions, cascades and inlets.

Author

N85-26622# Mitsubishi Heavy-Industries Ltd., Tokyo (Japan).
COMPUTATIONAL AERODYNAMICS IN DESIGNING AIRCRAFT **c05**

Michi-aki Kono *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 91-100 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

The utilization of computational aerodynamics in the major aircraft developments is reviewed. Aerodynamic calculation technology used in each aircraft is outlined as follows: (1) MU-2 business turboprop airplane, sources are introduced to simulate the airflow past the spoiler which is the aircraft's aerodynamic feature; (2) XC-1, the potential flow thoery with boundary layer correction is used for wing design together with the panel method for air-intakes; (3) XT-2, the transonic and supersonic area-rule was a reliable guide in the design of the fuselage, and the lifting surface theory was effective in the design of a wing with a small aspect ratio. (4) MU-300 business jet airplane, transonic aerodynamic calculations are ready for use, such as the transonic full potential code for airfoils and the small disturbance code for wings. The evaluation of the various effects with reasonable accuracy and the use of computer techniques is emphasized. E.A.K.

N85-26623# National Aerospace Lab., Tokyo (Japan).
NUMERICAL EXAMPLE OF THREE-DIMENSIONAL FLYING OBJECT IN SHOCKLESS TRANSONIC FLOW **c02**

Masayoshi Nakamura *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 101-107 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

A quasi-aircraft was numerically simulated in a physical space to design a shockless aircraft in a transonic flow. A three-dimensional artificial flow method was used for obtaining aircraft configurations in shockless transonic flows. This method is an extension of the artificial flow method used with two-dimensional flows. An original quasiaircraft is composed of a body, a sweptback wing and a tail unit, and it has no lift. Under the design conditions of a free stream Mach number of 0.87, and an angle of attack of 0 deg, the original quasiaircraft is partially modified and a shockless transonic quasiaircraft is obtained numerically. The potential flow is applied and the flow model has the effects of walls of a wind tunnel. E.A.K.

N85-26624# National Aerospace Lab., Tokyo (Japan).
NAVIER-STOKES SOLUTION OF HYPERSONIC BLUNT-NOSED BODY FLOWFIELDS **c02**

Yukimitu Yamamoto *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 109-122 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

Numerical algorithm to solve the unsteady thin-layer Navier-Stokes equations in a strong conservative form was used to compute the flow around capsule-type bodies in a hypersonic free stream. When these vehicles enter the atmosphere, aerodynamic heating becomes so severe that exact numerical viscous flow predictions are needed for the design of thermal protection systems. Body configurations consist of two segments: the nose and shoulder radii R(1), R(2), respectively. Shoulder radius R(2) is varied from 1.0 to 0.05, nondimensionalized by the nose radius r(2). Free stream conditions are set at the same conditions as in the hypersonic wind tunnel to compare numerical results with experimental data: a free stream Mach number of 7.0 with a Reynolds number of 4.5 x 100,000 based on the nose radius R(1). The capability of the present numerical procedure for computing such three-dimensional viscous flowfields is demonstrated. E.A.K.

N85-26625# Hitachi Ltd., Tokyo (Japan).
RECENT ADVANCES IN SUPERCOMPUTERS **c60**

Toshihko Odaka *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 123-130 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

The architectures and highlights of recent scientific computers is reviewed focusing on the new wave of supercomputers. Historically several architectures for superhigh-speed computation were proposed: pipeline processing, parallel processing, and processor array, represented by CRAY-1, Burroughs Scientific Processor (BSP), and Distributed Array Processor (DAP), respectively. The latest models developed are: CYBER205, CRAY X-MP, S-810 (Hitachi), VP (Fujitsu), and SX (NEC). All of these employ a pipeline approach and are highlighted by high speed vector arithmetic, a wide coverage of vector processing, and large storage capacities. These capabilities are particularly characteristic of the Japanese supercomputers. For example, Hitachi's S-810 delivers a maximum vector arithmetic speed of 630 MFLOPS, vectorizes FORTRAN DO loops containing complex statements, and has a hierarchical storage organization consisting of up to 256MB of main storage and up to 1000MB of extended storage composed of semiconducter memory chips.

E.A.K.

N85-26626# Kyoto Technical Univ. (Japan).
RECENT PROGRESS IN COMPUTATIONAL AERODYNAMICS **c02**

Nobuyuki Satofuka *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 130-139 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

Recent developments in computational aerodynamics are surveyed. Methods for numerical grid generation techniques are reported. Techniques which have already been used successfully on practical problems or appear to have such potential are emphasized. Approaches for acceleration of convergence, i.e., the pseudounsteady methods and the multigrid methods are reviewed. A new explicit method is devised for solving the Navier-Stokes equations for unsteady compressible viscous flow. The method is shown to be very accurate and efficient when compared with the implicit methods. E.A.K.

N85-26627# Mitsubishi Heavy-Industries Ltd., Nagoya (Japan).
COMPUTATIONAL AERODYNAMICS FOR AIRCRAFT WING DESIGN **c05**

Tadayuki Tanioka *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 141-155 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)

Avail: NTIS HC A10/MF A01

The progress in computer technology has made a variety of computational aerodynamics available for designing aircraft sitapes, especially wings, for which wind tunnel test data were almost the only design tool for aerodynamic engineers. In order to more efficiently apply computational aerodynamics to the designing process, efforts were made, such as combining several computational codes, providing a common data base for input/output, and introducing interactive graphic displays for easy communication with the designer. Current computational technology and the overall aerodynamic design process of wings are discussed. E.A.K.

N85-26628# Fuji Heavy Industries Ltd., Utsunomiya (Japan).
COMPARISON OF COMPUTATIONAL RESULTS OF A FEW REPRESENTATIVE THREE-DIMENSIONAL TRANSONIC POTENTIAL FLOW ANALYSIS PROGRAMS **c02**

Kohei Tanaka and Hideo Hirose *In* National Aerospace Lab. Proc.

of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 157-167 refs In JAPANESE (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

Three-dimensional transonic potential flow analysis programs were applied to the designs of: (1) transonic transport; (2) small transonic aircraft; (3) the evaluation of area rule on the fuselage of a transport-type aircraft; and (4) in the use in the boundary layer computation. In (1), computation of the small disturbance potentials at the wing and fuselage sections are satisfactory. However, the interference by the fuselage and wing is minimum in a transport aircraft. In (2), the interference from the wing and the fuselage is much larger than that of the transport and the computation of the wing alone results in a large discrepancy from the actual figure. The computation of the wing and fuselage is accurate. In the evaluation of the effect of the area rule (3), the results of the computation correspond well with the data obtained from the wind tunnel test. The boundary layer computation (4) is included to add viscosity effect to most of the transonic potential air flow programs. This addition improves the accuracy of the localization and strength of the shock wave and recovery of the pressure following the shock. It is concluded that the following items are required in the future programs: analysis of the entire aircraft including interferences from each section, inclusion of viscosity and nonstationary flow in the program, generation of reliable data in a relatively short time period, and domestic origin of such programs. Transl. by B.G.

N85-26629# Kawasaki Heavy Industries, Ltd., Akashi (Japan).
THE ROLE OF COMPUTATIONAL FLUID DYNAMICS IN AERONAUTICAL ENGINEERING **c34**
Jun Okumura, Tadamasa Jyonouchi, and Keisuke Sawada *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 169-186 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

Some of the available methods in actual design and the trend in computational fluid dynamics (CFD) are presented. Inviscid linear flow, the panel method and the vortex lattice method are the only methods for analyzing arbitrary practical configurations and are the most useful engineering tools available. Although these approach a relatively mature level, the improvement required for these methods are: (1) capability of treating more complicated realistic geometries; (2) development of the resources needed to supply the error-free input data; and (3) extension to the free boundary problem such as leading-edge vortex. The inviscid nonlinear flow, the vigorous advance of CFD, especially in the transonic regime, had a strong impact on changing the previous semiempirical design methods to more rational ones and it has shortened the design time and reduced costs. The most promising available codes, which analyze wing-body combinations, are expected to provide the new technological capability of interpreting the various useful design rules. The separated viscous flow, the calculations of Reynold's averaged equations are expected to become effective design tools for evaluating off-design features. It leads to the elimination of oversized margins in design. The three groups of numerical methods are expected to make progress more or less in parallel with each other. E.A.K.

N85-26630# National Aerospace Lab., Tokyo (Japan).
NUMERICAL SIMULATION OF TRANSONIC FLUTTER OF A HIGH-ASPECT RATIO TRANSPORT WING **c08**
Koji Isogai *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 187-198 refs In JAPANESE (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

The transonic flutter of a high-aspect ratio transport wing was numerically simulated using a transonic three dimensional aerodynamic approach with a consideration given to the effect of shock waves. In the numerical simulation, the equation controlling the flow (complete potential equation) and that for the wing motion were simultaneously solved and the time-dependent response of the elastic deformation of the wing was obtained directly. The flutter threshold predicted by the numerical simulation corresponded well with the experimental results. Transl. by B.G.

N85-26631# National Aerospace Lab., Tokyo (Japan).
A NUMERICAL DESIGN METHOD FOR THREE-DIMENSIONAL TRANSONIC WINGS **c05**
Susumu Takanashi *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 199-205 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

A numerical design procedure for three-dimensional transonic wings is presented. The boundary value problem is solved for the wing geometry which induces a prescribed pressure distribution subject to additional requirements on trailing-edge closure. The method is based on the transonic small disturbance theory and utilizes a type-dependent relaxation technique. Design results for large aspect ratio supercritical swept wings are also presented. E.A.K.

N85-26632# National Aerospace Lab., Tokyo (Japan).
THREE-DIMENSIONAL WING BOUNDARY LAYER ANALYSIS PROGRAM BLAY AND ITS APPLICATION **c02**
Kenichi Matsuno and Tomiko Ishiguro *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 207-218 refs In JAPANESE (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

The boundary layer calculation program (BLAY) is a program code which accurately analyzes the three-dimensional boundary layer of a wing with an undefined plane. In comparison with other preexisting programs, the BLAY is characterized by the following: (1) the time required for computation is shorter than any other; (2) the program is adaptable to a parallel processing computer; and (3) the program is associated with a secondary accuracy in the z-direction. As a boundary layer modification to transonic nonviscous flow analysis programs, it is used to adjust viscous and nonviscous interference problems repeatedly. Its efficiency is an important factor in cost reduction in aircraft designing. Transl. by B.G.

N85-26633# Naval Postgraduate School, Monterey, Calif.
GRAPHIC SIMULATION OF A MACHINE-REPAIRMAN MODEL M.S. Thesis
R. E. Nelsen Sep. 1984 88 p
(AD-A151761) Avail: NTIS HC A05/MF A01 CSCL 09/2

A discrete-event simulation of a stochastic process, a machine-repairman model, has been programmed on the IBM Personal Computer. The model consists of three helicopters, of which two are in service and one is in cold standby, with an option of one or two repairmen. The program output is a graphics display containing a system state-versus-time graph, a table of statistics, and animated figures that illustrate the current state of the system. The program user can directly observe the dynamics of the model as the fixed-increment, simulation clock advances. The user has the option of changing the following model parameters: helicopter failure rate, repairman service rate, and the number of repairmen to employ. GRA

N85-26634# Naval Postgraduate School, Monterey, Calif.
A PRELIMINARY ANALYSIS OF C-12 AIRCRAFT USAGE BY THE NAVY AIR LOGISTICS SYSTEM M.S. Thesis
R. L. Gilson Sep. 1984 100 p
(AD-A151921) Avail: NTIS HC A05/MF A01 CSCL 01/3

Exploratory data analysis techniques are utilized in this thesis in an attempt to understand the operation of the Navy Air Logistics System as a prerequisite to determining potential locations for additional C-12 aircraft already in the pipeline. Graphical analyses of flight data from Fiscal Year 1983 are combined with interviews of commands responsible for scheduling the aircraft to determine a measure of relative efficiency between the 23 bases currently supporting the aircraft. Glenview and Jacksonville are the recommended sites for the first two new C-12's. Several opportunities for further study and analysis are suggested. GRA

N85-26635# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE BIMONTHLY BULLETIN NUMBER 1984-2, 219/MARCH-APRIL
Claude Sevestre, ed. Paris ESA Dec. 1984 76 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimensuel (Paris), No. 1984-2, 219/Mar.-Apr. 1984
(ESA-TT-878) Avail: NTIS HC A05/MF A01; print copy in ENGLISH available at ONERA, Paris FF 60; original report in FRENCH available at ONERA FF 60

Vortex flows; cryogenic wind tunnel tests; laminar instability theory and transition criteria in two and three dimensional flow; cesium atomic clock characterization in a disturbed environment; and the limit, for a vanishing viscosity, of a steady, incompressible flow are discussed. Author (ESA)

N85-26636# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE BIMONTHLY BULLETIN NUMBER 1984-3, 220/MAY-JUNE
Claude Sevestre, ed. Paris ESA Dec. 1984 83 p refs Transl. into ENGLISH of La Rech. Aerospatiale Bull. Bimensuel (Paris), No. 1984-3, 220/May-Jun. 1984
(ESA-TT-882) Avail: NTIS HC A05/MF A01; print copy in ENGLISH available at ONERA, Paris FF 60; original report in FRENCH available at ONERA FR 60

A method for calculating turbulent three dimensional flows in diffusers; a model for quantitative X-ray microanalysis; a method for computing infrared transmission through the atmosphere; transient compressible fluid structure interaction; computation of unsteady aerodynamic pressure coefficients in a transonic straight cascade; calculation of streamlines from wall pressures on a fusiform body; and noise generated by a subsonic jet are discussed. Author (ESA)

N85-26637# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE BIMONTHLY BULLETIN, NUMBER 1984-4, 221/JULY-AUGUST
Claude Sevestre, ed. Paris ESA Dec. 1984 67 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimensuel (Paris), No. 1984-4, 221/Jul.-Aug. 1984
(ESA-TT-884) Avail: NTIS HC A04/MF A01; print copy in ENGLISH available at ONERA, Paris FF 60; original report in FRENCH at ONERA, Paris FF 60

Optical signal processing; numerical modeling of a vortex breakdown in a laminar flow of revolution; hydrodynamic visualization of the flow around a streamlined cylinder with suction (Cousteau-Malavard turbine sail model); transition phenomena on an infinite swept wing; unsteady flow around a buffeting wing; and application of laser velocimetry to electrostatic precipitators are discussed. Author (ESA)

N85-26638# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
COST EFFECTIVE AND AFFORDABLE GUIDANCE AND CONTROL SYSTEMS
Loughton, England Feb. 1985 290 p refs In ENGLISH and FRENCH Proc. of the 39th symp., Izmir, Turkey, 16-19 Oct. 1984
(AGARD-CP-360; ISBN-92-835-0373-2) Avail: NTIS HC A13/MF A01

This volume contains the Technical Evaluation Report, the Keynote address and 24 out of the 26 papers presented at the Guidance and Control Panel 39th Symposium. The papers covered the following topics: (1) cost effectiveness models/systems configuration and design tools; (2) low cost, high reliability guidance and control sensors; (3) computational techniques and data processing; (4) reduction of development and support costs; and (5) examples of cost-effective accomplishments and approaches. For individual titles, see N85-26639 through N85-26662.

N85-26639# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Aircraft Div.
SOME ASPECTS OF HOW TO DESIGN COST-EFFECTIVE FLIGHT CONTROL SYSTEMS **c08**
U. Butter and L. Botzler *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 14 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The design of flight control systems for fighter aircraft is discussed with respect to areas which contribute to minimizing life-cycle costs. As life-cycle costs include all costs accumulating during the whole life of the system, all phases from the design to in-service use are considered. Any structural and technological design features that are introduced to save costs during system operation and maintenance require additional development effort. Therefore, the expected cost benefit has to be balanced against the development effort invested into the system to achieve a cost-effective design. Author

N85-26640# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).
COMBINATORIAL PERFORMANCE/COST ANALYSIS OF AN AUTONOMOUS NAVIGATION SYSTEM FOR AIRCRAFT [ANALYSE COMBINATOIRE PERFORMANCES/COUTS DUN SYSTEME AUTONOME DE NAVIGATION POUR AERONEFS] **c04**
P. Lloret and G. Lavoipierre *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 12 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

A simple method is proposed for assisting the designer of autonomous navigation systems for aircraft in the choice of an optimal solution from the point of view of performance and cost. The proposed method is applied to a list of navigation system inertial navigation systems and on original rules uniting the price and the performance or the volume of the system considered. The combinatorial analysis proposed utilizes performance and cost data by comparing the cost of an inertial navigation system considered as a reference to the costs of solutions regarding a less effectively performing alternative inertial and one or more added sensors. The navigation of a combat helicopter is used to illustrate the method. Transl. by A.R.H.

N85-26641# Marconi Avionics Ltd., Rochester (England).
NAVIGATION: ACCOUNTING FOR COPY **c04**
Derrick J. Hamlin *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 11 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The ideal navigation system, from the point of view of the supplier, is a saleable system. From the user's point of view, the ideal navigation system would support the operational functions of his vehicle with perfect precision at all times. That the matching of these aims has been challenging is evidenced by the staggering array of systems which have been marketed for the purpose since the 1940's, the range of principles employed, their characteristics and their costs. The contending technologies for the navigation element of various types of guidance and control applications are surveyed. The practical constraints on both supplier and user in attaining the ideals are illustrated. Examples are presented from both civil and military fields which are relevant to guidance and control, where improvements in cost effectiveness are being achieved. B.W.

N85-26642# Naval Air Systems Command, Washington, D. C.
DESIGN ADEQUACY: AN EFFECTIVENESS FACTOR **c31**
A. R. Habayeb *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 16 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The concept of system effectiveness is reviewed and examined from the perspective of weapon systems consisting of launch platforms, targeting avionics, weapons, and targets. The application of system effectiveness to hardware systems is based on three effectiveness factors: (1) reliability (dependability), (2) readiness

(availability); and (3) design adequacy (capability). Design adequacy is a measure of how well a system performs its functions. It is the most desired factor in the definintion, design, and early stages of system development. A design adequacy quantification methodology is presented and the relationship between design limitation and adequacy is discussed. The design adequacy methodology is based on the measures of adequacy, system parameters, subsystem parameters and the employment phases of the system. In a weapon system context, the performance parameters of a guidance and control subsystem, are interdependent with the parameters of the remaining subsystems. The paper deals with three employment phases of a weapon system. The three phases are: (1) prelaunch phase; (2) free flight phase; and (3) end-game phase. Examples based on air-to-air missiles are given to illustrate these relationships and concepts. B.W.

N85-26643# Politecnico di Milano (Italy).
THE EVOLUTIVE STATE: A NEW DEFINITION OF SYSTEM STATE TO INCLUDE SEQUENCING OF EVENTS
V. Amoia and R. Somma (Selenia Spazio, Rome, Italy) *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 14 p refs (For primary document see N85-26638 16-38)
Avail: NTIS HC A13/MF A01

The usual reliability modeling is based on the introduction of a system state (herewith referred to as macrostate) identified by the operating conditions (good, failed) of the system components. The inclusion of the information about the states sequencing, absent in the classical description, leads to the introduction of the concept of microstate. The peculiar properties of the microstate concept are discussed. A computing procedure was proposed, which shows that, despite the number of microstates, in general infinite, a truncated analysis can be performed to the desired degree of approximation. B.W.

N85-26644# Thomson-CSF, Issy les Moulineaux (France).
OPTMIZING THE SPECIFICATIONS FOR AN AIR-SURFACE LASER SYSTEM [OPTIMISATION DES SPECIFICATIONS DUN SYSTEME AIR-SURFACE LASER] c36
Jean-Pierre Murgue and Didier Evrard (MATRA Service Aerodynamique, Velizy-Villacoublay, France) *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 7 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

Preliminary studies needed to specify a laser-guide air-to-surface attack system are presented as an example of meeting the requirements for cost effectiveness in weapons systems. Emphasis is on attacking missile launching patrol boats. It is shown that bombing is an economic solution and that it is possible to cost effectively optimize the definition of the nacelle of the laser designator for bombing which demands look back angle optimization, as well as the guidance of the bomb which must remain at very low altitude to satisfy predicted meteorological conditions, and be sufficiently precise for the acquisition of small, rapid targets. B.W.

N85-26645# Singer Co., Wayne, N. J.
DESIGN-TO-COST (DTC) METHODOLOGY TO ACHIEVE AFFORDABLE AVIONICS c06
Albert J. Shapiro *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 18 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

In response to the continual exponential growth in the complexity and cost of military weapon systems, especially the electronics portions, the United States Department of Defense has implemented a Design to Cost (DTC) procurement policy. The objective of this policy is to meet essential and desired operational requirements in the most cost effective manner by setting cost targets at the start of the procurement process. A methodology is described for developing electronic equipment to meet DTC requirements. Specific management action is required in establishing an appropriate organization as well as procedures and guidelines for the engineering development process and subsequent production to achieve the cost targets. The critical role of computer aided design in optimizing the electronic system design is highlighted. An example of a DTC program successfully applied to the Lightweight Doppler Navigation System (LDNS) AN/APN-128 is reviewed. Author

N85-26646# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).
PREGUIDANCE AND PILOTING WITH THE AID OF COMPOSITE INERTIAL SENSORS [PREGUIDAGE ET PILOTAGE A LAIDE DE SENSURS INERTIELS COMPOSITES] c04
J. Resseguier *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 15 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

To resolve the problem of preguiding small motors equipped with homing heads, SAGEM designed and built SIGAL (United integrated gyro-accelerometer system) equipment, compatible with constraints of volume, maintainability, and price. These sure measurement systems use: composite inertial sensors that are both rate gyros and accelerators; multiplexed loops; a strapdown arrangement; and an adapted electronic technology. The principle of the triazial measurement system is examined as well as the capabilities of SIGAL in meeting the needs of preguiding air-to-air, ground-to-air, and air-to-ground systems. Transl. by A.R.H.

N85-26647# Litton Guidance and Control Systems, Woodland Hills, Calif.
LASER GYROSCOPE RANDOM WALK DETERMINATION USING A FAST FILTERING TECHNIQUE c35
John G. Mark and Alison Brown *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 17 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

In order to reduce the effect of quantization error on gyro test data, Litton has developed a high speed filter which outputs half second accumulated data samples. The quantization noise power in these samples is reduced by a factor greater than 512 while the random walk characteristics are virtually unaffected. High precision measurements of a gyro's random walk coefficient may therefore be obtained from a small data set. The operation of this fast filtering technique, is described, and its effect on gyro test data is analyzed, and laser gyro test results are presented which demonstrate the technique. Author

N85-26648# Smiths Industries Ltd., Bishops Cleeve (England).
THE SERIES 2000: A MINIATURE GAS BEARING DTG FOR LOW COST STRAPDOWN GUIDANCE AND CONTROL c04
G. Beardmore *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 14 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The development and status of a Dynamically Tuned Gyroscope (DTG) is described, with particular reference to the specialized technology employed to yield a cost effective design. Its configuration posesses a number of important advantages over those used in conventional tuned sensors, and allows, for the first time, a self acting gas bearing to be incorporated in a strapdown DTG. Other features of the design include the use of a capacitive pick off to replace the traditional inductive version, a high performance spin motor and a fully fabricated flexure hinge. this hinge overcomes many of the technical and commercial disadvantages of the now familiar carved from solid hinges. The problems that have hitherto prevented the application of gas bearing technology to tuned sensors are discussed. Current performance of the sensor is summarized and its advantages over contemporary rate sensors are compared with the requirements of future guidance and control applications. These include airborne, missile, underwater and surface systems where life, reliability, ready time and affordability are of prime importance. Author

N85-26649# Societe Francaise d'Equipements pour la Navigation Aerienne, Velizy-Villacoublay (France). Dept. Inertie et Optique.
GYROLASER GUIDANCE SYSTEM FOR MEDIUM RANGE MISSILES c36
Bernard deSalaberry *In* AGARD Cost Effectiveness and Affordable Guidance and Control Systems Feb. 1985 11 p refs In FRENCH; ENGLISH summary (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

Laser gyro technology is now developed to the point where this type of inertial sensor can be used on medium range tactical missiles. After outlining the performances required for these sensors. The laser gyros and accelerometers chosen to construct an inertial system designed for the guidance and control of such a missile is described. The problems of filtering noise on the laser gyro readout signals is also be examined. Author

N85-26650# Societe Crouzet, Valence (Ffance).
THE USE OF A SELF-COMPENSATED MAGNETOMETER IN AN ECONOMICAL NAVIGATION SYSTEM FOR THE HELICOPTER [UTILISATION DUN MAGNETOMETRE AUTOCOMPENSE DANS UN SYSTEME DE NAVIGATION ECONOMIQUE POUR HELICOPTERE] c04
J. L. Roch, J. C. Goudon, and Ph. Chaix *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 10 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

Analysis of a mission of a military helicopter show the need for installing a navigation system, since to assure its safety and avoid detection by enemy systems, the helicopter must follow the terrain at a height less than or equal to 50m, and at a varying speed. It is difficult to take bearings during the so-called tactical phases of flight. Various autonomous navigation systems are examined. The advantages of using a magnetometer, the choice of magnetic sensor, and the principles of compensation are discussed. Results obtained using a system with a three-axis static magnetometer on the PUMA SA 330 and the GAZELLE SA 342 helicopter aare summarized and conform to operational requirements of the French army for the GV76 and RDN 80 B.
Transl. by A.R.H.

N85-26651# European Organisation for the Safety of Air Navigation, Brussells (Belgium).
A COST-EFFICIENT CONTROL PROCEDURE FOR THE BENEFIT OF ALL AIRSPACE USERS c81
Andre Benoit and Sip Swierstra *In* AGARD Cost Effective and Affordable Guidance and Control Systems refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

A control procedure for conducting time of arrival constrained flights in an economic manner is proposed. This procedure is intended to be compatible with present day voice communications (human or synthetic) although it is primarily designed to be used in conjunction with future automated digital data communications. The procedure is applicable to the transit of flights through terminal areas such as are considered in connection with Zone-of-Convergence-type systems, and the final approach phase is accordingly integrated with the en route descent, cruise and (possibly) climb phases, or appropriate parts thereof. A detailed description of the procedure is presented together with brief summaries of the tests conducted in present and simulated future environments to assess its efficiency, and then sets out the results obtained to date and analyses them in terms of 4-d navigational accuracy and operational effectiveness. Author

N85-26652# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany).
WIND MODELLING FOR INCREASED AIRCRAFT OPERATIONAL EFFICIENCY c02
W. Lechner and R. Onken *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 12 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

Accurate knowledge of the wind in magnitude and direction as a function of airspace position and time is an essential part for navigation and for fuel efficiency and efficient planning and control of air traffic. The demand for wind data in four dimensional guidance was examined. The calculation of the three dimensional flight path command subject to time-of-arrival constraints (fourth dimension) requires wind prediction along the complete flight path the aircraft is going to track. Since the flight path is calculated and updated on line wind information has to be available at any time for the respective three dimensional airspace. The wind data, currently available are not sufficient when used as single source. An actual wind situation can extremely deviate from what the MET service announces. Complementary or even quite different techniques emrge for wind estimation, in particular using modern aircraft sensor and computer equipment. Airborne wind estimation techniques were developed and implemented in the automatic digital flight control system of the DFVLR's test aircraft HFB 320. The efficiency of these techniques, is demonstrated. E.A.K.

N85-26653# British Aerospace Public Ltd. Co., Preston (England).
A METHOD OF ESTIMATING AIRCRAFT ATTITUDE FROM FLY BY WIRE FLIGHT CONTROL SYSTEM DATA c08
Reginald J. V. Snell *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 9 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The use of active control technology (ACT) to control the aircraft flight both led to flight path sensors and associated computing. The use of these data to extract aircraft attitude was studied. This would avoid the requirement for supplementary hardware in the form of an attitude references system and Artificial horizon and could endow the source of attitude with the high integrity annd availability associated with flight control systems. An experimental application was flown on the ACT Fly-by-Wire Jaguar Demonstration aircraft using digital data originating in the Flight Control System. The flight results demonstrated good accuracy and stability in the general course of flying. If attitude can be established with sufficient accuracy, it is feasible to extract magnetic heading from a three axis magnetometer. Heading, together with attitude and air data information provides the basis for a dead reckoning navigation system. Such a basic system could be aided by a continuous terrain profile matching system to provide high accuracy navigation. The method offers a source of high integrity attitude and could serve as the basis for a low cost, highly accurate navigation system suitable for operation over digitally mapped terrain, either as a stand alone system or a back up for cross monitoring an inertial navigation system. E.A.K.

N85-26654# Marconi Avionics Ltd., Rochester (England). Airport Works.
THE IMPACT OF VLSI ON GUIDANCE AND CONTROL SYSTEM DESIGN c18
Don Price *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 4 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The potential of very large scale integrated circuit technology to reduce cost, including life cycle cost, of avionics systems was examined. Trends in methods of silicon realization and in system complexity are related to the necessary advances in methods of system design. A generic system design approach is outlined, which emphasis the discilines which are likely to enable cost-effective semicustom circuit design to become viable. E.A.K.

N85-26655# Air Force Armament Lab., Eglin AFB, Fla.
REUSABLE SOFTWARE: A CONCEPT FOR COST REDUCTION c61
Christine M. Anderson and Marlow Henne *In* AGARD Cost Effectiveness and Affordable Guidance and Control Systems Feb. 1985 6 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The cost of military computer systems is increasing rapidly, and the percentage of the total cost attributed to software is also increasing. Several underlying causes for this increase are

discussed. While the new United States (US) Department of Defense (DoD) standard high order language, Ada, will significantly help to reduce the software cost growth, other solutions must be sought. Reusable software component technology and associated parts composition sytems are presented as possible solutions.
E.A.K.

N85-26656# Software Sciences Ltd., Farnborough (England).
MAINTAINING CONSISTENCY AND ACCOMMODATING NETWORK REPAIR IN A SELF-REGENERATIVE DISTRIBUTED DATABASE MANAGEMENT SYSTEM (A DISCUSSION OF THE MEANS AND COST) **c82**
M. Reilly, P. R. Tillman, R. Catt, and R. B. Moore *In* AGARD Cost Effective and Affordable Guidance Control Systems Feb. 1985 11 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The ADDAM is a data base management system that maintains a real-time data base which is partitioned and replicated amongst a number of computers connected in a local area network. With a centralized or quasidistributed data base, damage to particular components caused effective loss of the whole system due to loss of data. The ADDAM can tolerate substantial damage to the network with little degradation of performance or loss of data. Some of the protocols used by ADDAM to maintain data consistence are described. It is shown that it is possible to provide a very high degree of data reliability within a resilient real-time distributed data base. However, the cost is quite large, both in terms of the amount of computer resources consumed by the data base software and the number of internode message generated on the network.
E.A.K.

N85-26657# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany). Missile Div.
SIMULATION: A TOOL FOR COST-EFFECTIVE SYSTEMS DESIGN AND LIVE TEST REDUCTION **c81**
Roland Gaugett *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 9 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

Taking advanced passive infrared guided missiles as an example of missile system simulation - both software and realtime hardware-in-the-loop including background - is a valuable tool to find cost-effective system designs and also to drastically reduce costs of field testing and live firing trials. The development of complex missile systems becomes questionable from a cost standpoint if the majority of the increased test efforts for this type of missiles is not substituted by missile system simulation. The author addresses Bodenseewrk's missile system simulation philosophy, simulation methods, high level programming language and the interfaces between the involved hardware and software. An in-depth discussion of the influence of simulation onto the flight testing requirements of missile developments and the resultant cost savings conclude this paper.
G.L.C.

N85-26658# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).
A DESCRIPTION OF THE PROCESS OF ELABORATING MAN-MACHINE DIALOG IN AN AIRCRAFT EQUIPPED WITH CATHODE TUBES: ROLES AND SPECIFICATIONS OF PILOTED SIMULATION METHODS [DESCRIPTION DU PROCESSUS DELABORATION DU DIALOGUE HOMME MACHINE DANS LES AVIONS DARMES EQUIPES DE TUBES CATHODIQUES ROLE ET DESCRIPTION MOYENS SIMULATION PILOTEE] **c54**
Pierre Helie *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 12 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The use of cathode ray tubes (or systems permitting equivalent representations) on future military aircraft is envisioned as well as multiplexed commands implanted in joysticks and throttles, and a system of vocal dialog. Engineers studying man-machine dialog must reexamine established principles and develop other work methods. Documents developed for defining the different stages of development of such a system and tasks required for validating man-machine dialog are examined. The operational OASIS system developed for the Mirage 2000 aircraft for piloted simulation is described.
Transl. by A.R.H.

N85-26659# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
TERRAIN FOLLOWING WITHOUT USE OF FORWARD LOOKING SENSORS **c04**
H. F. Schwegler and B. Schreiner *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 3 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

A system is presented which allows an aircraft to follow a preplanned vertical profile along a planned route. Using a simple representation of the planned vertical profile instead of terrain data the computational tasks to be performed in the aircraft in real time are minimized. This system may ease some operational problems of todays military aircraft when flying in hostile environment until the advent of more sophisticated systems likely to be based on the intelligent combination of forward looking sensor data and stored map derived information
G.L.C.

N85-26660# Technische Univ., Brunswick (West Germany).
THE USE OF PRESSURE SENSING TAPS ON THE AIRCRAFT WING AS SENSOR FOR FLIGHT CONTROL SYSTEMS **c35**
Dirk Brunner *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 8 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

For the low speed operation of aircraft, during STOL-take off or STOL-landing and for windshear situations a precise measurement of the state of the aerodynamic flow is required. Normally the dynamic pressure is used to assess the state of flow, thus defining the stall margin in terms of a speed factor. However, flying at higher lift coefficients, a precise maintainence of a given lift coefficient by controlling the speed is no longer feasible. Instead, controlling the angle of attack or controlling the lift coefficient directly should be used. Some methods for the measurement and the control of the state of the aerodynamical flow including wing tap pressure measurements are discussed. Wind tunnel results are presented, that show the pressure distribution of a slotted STOL-wing and the typical relationship between the tap pressure, angle of attack and flap angle. Wing tape pressure measurements taken with the STOL-aircraft Do 28 aircraft are then discussed showing the feasibility of the method described to sense the state of flow.
G.L.C.

N85-26661# Ferranti Defence Systems Ltd., Edinburgh (Scotland).
LOW COST TWO GIMBAL INERTIAL PLATFORM AND ITS SYSTEM INTEGRATION **c04**
R. N. Priestley and J. B. Towler *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 14 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The development of more accurate inertial systems has led to more expensive inertial instruments and complex electronics. Future navigation systems will require further improvements in accelerometer and gyro design in order to achieve the required performance. There are however doubts as to whether autonomous inertial systems will be sufficiently accurate. An alternative approach is to combine a second sensor with the inertial system to improve performance, for example doppler velocities or NAVSTAR/GPS positions and velocities. The inertial platform may then be simplified, retaining high accuracy only in the platform parameters having an impact on the integrated system performance. This simplification allows lower cost of ownership with an increase in reliability and a medium accuracy reversion capability. The inertial system computer may be programmed with the integration software so avoiding a separate dedicated integration computer with the consequent decrease in reliability.
G.L.C.

N85-26662# Kongsberg Vapenfabrikk A/S (Norway).
COST-EFFECTIVE MISSILE GUIDANCE THROUGH DISTRIBUTED ARCHITECTURE AND STANDARD PROCESSES
c15
H. Gloerud *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 6 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

The development of the Penguin MK3 missile was initiated by the Royal Norwegian Air Force as a modern stand-off weapon for the F-16 aircraft. The guidance and control system of this missile is built upon the most modern principles using all digital electronics with distributed computational power. The system is separated in 6 main functions, each with its own powerful processor. High performance is achieved through the use of latest generation standard microprocessors and connected together by a high capacity data bus. Some of the results obtained from this development are described. G.L.C.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N85-26663 Aerazur C.A., Issy-les-Molineaux (France).
PARACHUTE EXTRACTION DEVICE FOR ULTRALIGHT GLIDERS Patent [DISPOSITIF D'EXTRACTION D'UN PARACHUTE POUR PLANEURS ULTRA-LEGERS ET PLANNEUR ULTRA-LEGER EQUIPE DU DISPOSITIF]
Jacques Rousseau Bern Swiss Patent Office Issued 15 Jun. 1984 5 p In FRENCH Filed 11 May 1981, Priority date 23 May 1980 FR 80 11565
(CH-643499-A5; Rept-3017/81; Intl-Cl-B64D-17/64) Avail: Swiss Patent Office

The device includes a projectile propelled by elastic energy and attached to the parachute itself by elastic strings. The system is proposed as an auxiliary safety and aerodynamic braking means. The projectile ejected at up to 180 km/hr deploys the auxiliary parachute in < 0.2 sec and the main parachute is then extracted by the force applied by the auxiliary parachute, which is of the order of hundreds of Newtons. Author (ESA)

N85-26664*# Amtec Engineering, Inc., Bellevue, Wash.
A METHOD FOR SIMULATING 3-D AIRCRAFT FLOW FIELDS WITH JET PLUME EFFECTS Monthly Technical Progress Reort, 1-31 Dec. 1984
1984 3 p refs
(Contract NAS2-11711)
(NASA-CR-175802; NAS 1.26:175802; MTPR-15) Avail: NTIS HC A02/MF A01 CSCL 01A

The objective is to develop, demonstrate, and document a coupled flow analysis procedure for computing 3D aircraft flow fields with deflected subsonic and supersonic jet exhaust plumes. The PNS plume code was transferred to the Ames computer facility for execution on the Cray computer. No problems were encountered when installing this code. The Bower's test case is currently being run. This case is being used to fine tune the procedure for coupling the plume code to PANAIR. B.G.

N85-26665*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mechanical Engineering, Aeronautical Engineering and Mechanics.
INVESTIGATION TO OPTIMIZE THE PASSIVE SHOCK WAVE/BOUNDARY LAYER CONTROL FOR SUPERCRITICAL AIRFOIL DRAG REDUCTION Final Report
H. T. Nagamatsu and R. Dyer Dec. 1984 33 p refs
(Grant NAG1-330)
(NASA-CR-175788; NAS 1.26:175788) Avail: NTIS HC A03/MF A01 CSCL 01A

The passive shock wave/boundary layer control for reducing the drag of 14%-thick supercritical airfoil was investigated in the 3 in. x 15.4 in. RPI Transonic Wind Tunnel with and without the top wall insert at transonic Mach numbers. Top wall insert was installed to increase the flow Mach number to 0.90 with the model mounted on the test section bottom wall. Various porous surfaces with a cavity underneath were positioned on the area of the airfoil where the shock wave occurs. The higher pressure behind the shock wave circulates flow through the cavity to the lower pressure ahead of the shock wave. The effects from this circulation prevent boundary layer separation and enthropy increase hrough the shock wave. The static pressure distributions over the airfoil, the wake impact pressure survey for determining the profile drag and the Schlieren photographs for porous surfaces are presented and compared with the results for solid surface airfoil. With a 2.8% uniform porosity the normal shock wave for the solid surface was changed to a lambda shock wave, and the wake impact pressure data indicate a drag coefficient reduction as much as 45% lower than for the solid surface airfoil at high transonic Mach numbers. E.A.K.

N85-26666# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
LOW REYNOLDS NUMBER VEHICLES
Thomas J. Mueller (Notre Dame Univ.) and Eli Reshotko, ed. (Case Western Reserve Univ.) Feb. 1985 77 p refs
(AGARD-AG-288; ISBN-92-835-1486-6) Avail: NTIS HC A05/MF A01

Recent interest in the subject of low Reynolds number configuration has entered on the design and evaluation of efficient airfoil sections at chord Reynolds numbers from about 100,000 to 1m. These configurations include remotely-piloted vehicles operating at high altitudes, sailplanes, ultra-ligh man-carrying/man-powered aircraft, wind turbines and propellers. Serious problems still exist with respect to boundary layer separations and transition below R(c)=500,000. Current design and analysis methods need improved criteria for laminar separation. Improved mathematical models for these complex phenomena require more experimental studies. For various reasons definitive experiments are difficult. The results of many experimental studies are presented to illustrate the type of difficulties encountered. Recommendations for future research are given. Author

N85-26667*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPLORATORY WIND-TUNNEL INVESTIGATION OF A WING-TIP-MOUNTED VORTEX TURBINE FOR VORTEX ENERGY RECOVERY
James C. Patterson, Jr. and Stuart G. Flechner Jun. 1985 24 p
(NASA-TP-2468; L-15795; NAS 1.60:2468) Avail: NTIS HC A02/MF A01 CSCL 01A

The Langley 8-foot transonic pressure tunnel was used for tests to determine the possibility of recovering, with a turbine-type device, part of the energy loss associated with the lift-induced vortex system. Tests were conducted on a semispan model with an unswept, untapered wing, with and without a wingtip-mounted vortex turbine. Three sets of turbine blades were tested to determine the effect of airfoil section shape and planform. The tests were conducted at a Mach number of 0.70 over an angle-of-attack range from 0 deg. to 4 deg. at a Reynolds number of 3.82 x 10 to the 6th power based on the wing reference chord of 13 in. Author

N85-26668*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
DEVELOPMENT OF A ROTOR WAKE-VORTEX MODEL, VOLUME 1 Final Technical Report
R. K. Majjigi and P. R. Gliebe Jun. 1984 171 p refs
(Contract NAs3-23681)
(NASA-CR-174849; NAS 1.26:174849) Avail: NTIS HC A08/MF A01 CSCL 01A

Certain empirical rotor wake and turbulence relationships were

developed using existing low speed rotor wave data. A tip vortex model was developed by replacing the annulus wall with a row of image vortices. An axisymmetric turbulence spectrum model, developed in the context of rotor inflow turbulence, was adapted to predicting the turbulence spectrum of the stator gust upwash. G.L.C.

N85-26669*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FINITE-DIFFERENCE COMPUTATIONS OF ROTOR LOADS
F. X. Caradonna and C. Tung Apr. 1985 19 p refs Prepared in cooperation with Army Research and Technology Labs.
(NASA-TM-86682; Rept-85132; NAS 1.15:86682; USAAVSCOM-TR-85-A-3) Avail: NTIS HC A02/MF A01 CSCL 01A

The current and future potential of finite difference methods for solving real rotor problems which now rely largely on empiricism are demonstrated. The demonstration consists of a simple means of combining existing finite-difference, integral, and comprehensive loads codes to predict real transonic rotor flows. These computations are performed for hover and high-advanced-ratio flight. Comparisons are made with experimental pressure data. Author

N85-26670*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AERODYNAMIC DETUNING ANALYSIS OF AN UNSTALLED SUPERSONIC TURBOFAN CASCADE
Daniel Hoyniak and Sanford Fleeter 21 Mar. 1985 25 p refs Presented at the 30th Intern. Gas Turbine Conf. and Exhibit, Houston, Tex., 17-21 Mar. 1985; sponsored by ASME
(NASA-TM-87001; E-2546; NAS 1.15:87001) Avail: NTIS HC A02/MF A01 CSCL 01A

An approach to passive flutter control is aerodynamic detuning, defined as designed passage-to-passage differences in the unsteady aerodynamic flow field of a rotor blade row. Thus, aerodynamic detuning directly affects the fundamental driving mechanism for flutter. A model to demonstrate the enhanced supersonic aeroelastic stability associated with aerodynamic detuning is developed. The stability of an aerodynamically detuned cascade operating in a supersonic inlet flow field with a subsonic leading edge locus is analyzed, with the aerodynamic detuning accomplished by means of nonuniform circumferential spacing of adjacent rotor blades. The unsteady aerodynamic forces and moments on the blading are defined in terms of influence coefficients in a manner that permits the stability of both a conventional uniformally spaced rotor configuration as well as the detuned nonuniform circumferentially spaced rotor to be determined. With Verdon's uniformly spaced Cascade B as a baseline, this analysis is then utilized to demonstrate the potential enhanced aeroelastic stability associated with this particular type of aerodynamic detuning. Author

N85-26671*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
APPLICATION OF CFD TECHNIQUES TOWARD THE VALIDATION OF NONLINEAR AERODYNAMIC MODELS
Lewis B. Schiff and Joseph Katz May 1985 18 p refs Presented at AGARD Fluid Dyn. Panel and Flight Mech. Panel Symp. on Unsteady Aerodyn.: Fundamentals and Appl. to Aircraft Dyn., Gottingen, West Germany, 6-9 May 1985
(Grant NAGw-218)
(NASA-TM-86715; Rept-85212; NAS 1.15:86715) Avail: NTIS HC A02/MF A01 CSCL 01A

Applications of Computational fluid dynamics (CFD) methods to determine the regimes of applicability of nonlinear models describing the unsteady aerodynamic responses to aircraft flight motions are described. The potential advantages of computational methods over experimental methods are discussed and the concepts underlying mathematical modeling are reviewed. The economic and conceptual advantages of the modeling procedure over coupled, simultaneous solutions of the gasdynamic equations and the vehicle's kinematic equations of motion are discussed. The modeling approach, when valid, eliminates the need for costly repetitive computation of flow field solutions. For the test cases considered, the aerodynamic modeling approach is shown to be valid. Author

N85-26672*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A NUMERICAL SIMULATION OF THE NFAC (NATIONAL FULL-SCALE AERODYNAMICS COMPLEX) OPEN-RETURN WIND TUNNEL INLET FLOW
Upender K. Kaul, James C. Ross, and James L. Jacocks (Calspan Field Services, Inc., Arnold Air Force Station, Tenn.) Apr. 1985 17 p refs
(NASA-TM-86724; Rept-85105; NAS 1.15:86724) Avail: NTIS HC A02/MF A01 CSCL 01A

The flow into an open return wind tunnel inlet was simulated using Euler equations. An explicit predictor-corrector method was employed to solve the system. The calculation is time-accurate and was performed to achieve a steady-state solution. The predictions are in reasonable agreement with the experimental data. Wall pressures are accurately predicted except in a region of recirculating flow. Flow-field surveys agree qualitatively with laser velocimeter measurements. The method can be used in the design process for open return wind tunnels. M.G.

N85-26673*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN EXPERIMENTAL AND ANALYTICAL STUDY OF THE AERODYNAMIC INTERFERENCE EFFECTS BETWEEN TWO SEARS-HAACK BODIES AT MACH 2.7 M.S. Thesis - George Washington Univ.
Jeffrey W. Bantle Apr. 1985 186 p refs
(NASA-TM-85729; NAS 1.15:85729) Avail: NTIS HC A09/MF A01 CSCL 01A

Aerodynamic interference effects were studied for two slender, streamlined bodies of revolution at Mach 2.7. A wind tunnel investigation produced force and moment data and measurements of pressure distributions on the bodies. As these bodies remained parallel with each other and with the freestream flow, their relative lateral and longitudinal spacing were varied. Results of theoretical methods were used in the analysis of results. The interference effects between the two bodies yielded less total drag than a single body of equal total volume and the same length. M.G.

N85-26674# Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.
DESCRIPTION OF A COMPUTER PROGRAM TREATING TRANSONIC STEADY STATE AEROELASTIC EFFECTS FOR A CANARD OR TAIL AIRPLANE
N. Agrell Oct. 1983 28 p refs
(Contract FMV-F:INK-82223-80-001-21-001)
(FFA-TN-1983-23) Avail: NTIS HC A03/MF A01

A program to calculate the aerodynamic loading of supersonic airplanes, using the transonic small perturbation potential method is described. A version to allow for two wing surfaces with wakes was developed. The wing deformations are assumed to be linear functions of the load distributions. The iterative procedure used to solve the transonic small perturbation potential equation in finite difference form can treat the flow field around given wing shapes. As the shape of elastic wings is, a priori, not known temporary wing shapes must be determined. These depend on temporary load distributions and are quantified through the deformation matrix of the wing. When external aerodynamic loads are in equilibrium with internal elastic forces the final shape of the wing is obtained. Author (ESA)

N85-26675# Aeronautical Research Inst. of Sweden, Stockholm.
MEASUREMENTS OF THE SYMMETRIC AERODYNAMIC COEFFICIENTS FOR FLAT FACED CYLINDERS IN THE ANGLE OF ATTACK REGIME 0 TO 90 DEG FOR TRANSONIC AND SUPERSONIC SPEEDS Final Report; M.S. Thesis
Hans Berglund Jan. 1984 224 p refs
(Contract FMV-FlygFL-82223-80-001-21-001)
(FFA-TN-1984-04) Avail: NTIS HC A10/MF A01

Flat faced right circular cylinders with a length to diameter ratio of 1.5, 2, 4 and 6 were investigated in wind tunnels for 8 Mach numbers in the range 0.5 to 3.0. The cylinders were equipped with sharp edges. To investigate the influence of corner radius, test runs (M = 0.5, 0.7) with slightly rounded edges were performed. Angle of attack range was 0 to 90 deg. The cylinders with rounded edges behave more like streamlined bodies than the sharp edged cylinders. Normal force and pitching moment coefficients increase as fineness ratio increases, while the tangential force coefficient vanishes, slightly affected by fineness ratio. A maximum for all coefficients occurs at Mach 1.42.

Author (ESA)

N85-26676# Laboratoire d'Aerothermique du CNRS, Meudon (France). Lab. d'Aerothermique.

MEASUREMENTS IN LOW PRESSURE FLOW USING AN ELECTRONIC BEAM DETECTOR Final Report, Sep. 1984 [MESURES DANS LES ECOULEMENTS A BASSE PRESSION PAR SONDE A FAISCEAU ELECTRONIQUE]

J. Lengrand, J. Allegre (Sessia), and M. Raffin (Sessia) Sep. 1984 34 p refs In FRENCH

(Contract DRET-81-634)

Avail: NTIS HC A03/MF A01

Density measurement in a gas flow by an electronic beam probe is discussed. A 20 keV electronic beam would interact with gas molecules producing a luminiscence such that the intensity and spectral distribution is a function of the gas flow parameters. A modified electronic gun permitted the exploration of the flow around a NACA 0012 profile at Mach 0.8 and Reynolds 220. The use of the electronic beam at this high density is limited by primary electron dispersion and by the nonlinearity between density and light emission.

Author (ESA)

N85-26677# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction des Grands Moyens d'Essais.

QUALIFICATION OF A WALL GAGE FOR THE SIMA WAGON, ADAPTED TO THE TEST OF HALF MODELS MOTORIZED BY COMPRESSED AIR TURBINES [QUALIFICATION DE LA BALANCE DE PAROI DU CHARIOT 1 DE SIMA, ADAPTEE POUR LES ESSAIS DE 1/2 MAQUETTES MOTORISEES PAR TURBINES A AIR COMPRIME (TPS)]

J. P. Becle Oct. 1984 39 p refs In FRENCH

(Contract STPA-8395017)

(ONERA-PV-1/8068-GY) Avail: NTIS HC A03/MF A01

A wind tunnel wall gage was tested by measuring the thrust of a standard blast pipe previously calibrated at a test bench. The results show a slight deviation at high temperatures of the feed air. The air was heated to avoid frost formation on the turbine cover. Tests show that no frost is formed at 25 C, thus assuring the best performance of the device.

Author (ESA)

N85-26678# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction Scientifique de la Resistance des Structures.

SYNTHESIS STUDY: VALIDATION OF A GUST GENERATOR IN THE PRESENCE OF A MODEL IN A WIND TUNNEL Final Report [ETUDE DE SYNTHESE. VALIDATION D'UN GENERATEUR DE RAFALE EN PRESENCE D'UNE MAQUETTE EN SOUFFLERIE]

Ch. Brotte Jul. 1984 38 p refs In FRENCH

(Contract STPA-83/95013)

(ONERA-RT-16/5108-RY-051; ONERA-RT-16/5108-RY-053) Avail: NTIS HC A03/MF A01

The comparison of local measurements of the fluctuations of wind incidence with and without model in wind tunnel tests, resulted in the conclusion that the gust characteristics are not affected by the presence of the model. The amplitude of the gust is half degree at Mach 0.5 up to 110 Hz.

Author (ESA)

N85-26679# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction Scientifique de la Resistance des Structures.

PRELIMINARY WIND TUNNEL STUDY OF THE INFLUENCE OF A JET ON THE UNSTEADY AERODYNAMICS OF A TURBOJET ENGINE Final Report [ETUDE PRELIMINAIRE EN SOUFFLERIE DE L'INFLUENCE D'UN JET SUR L'AERODYNAMIQUE INSTATIONNAIRE D'UN REACTEUR]

A. Gravelle May 1984 31 p ref In FRENCH

(Contract STPA-83/95030)

(ONERA-RT-12/5115-RY-230-R-231G) Avail: NTIS HC A03/MF A01

The unsteady forces produced by engine displacements were evaluated including the jet effect. A jet nacelle model, 1/20 scale, was tested in a wind tunnel. The nacelle was subjected to 10 and 20 Hz oscillations of 1 deg amplitude. The jet flow was variable. Another model with a double flow permeable wall was also tested. An important nonlinear effect related to the incidence angle of the nacelle is detected, showing the importance of the presence of the jet.

Author (ESA)

N85-26680# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

CONICAL STAGNATION POINTS IN THE FLOW AROUND AN EXTERNAL CORNER

P. G. Bakker and J. W. Reyn Oct. 1983 34 p refs

(VTH-LR-396) Avail: NTIS HC A03/MF A01

The supersonic flow around configurations consisting of two plane delta wings, attached to each other along a common edge, forming an external corner is discussed on the basis of potential conical flow theory. The occurrence and character of conical stagnation points is studied as a bifurcation from the starlike node in the conical streamline pattern, which occurs at the corner point in a uniform flow. Various bifurcation modes are possible, including those where nodal points move away from the corner on which a saddle point is formed. Flow around a symmetrical external corner illustrates the use of the first bifurcation mode to obtain a better understanding of the flow field. The flow pattern with a saddle point at the corner flanked by two nodal points on the body surface is confirmed.

Author (ESA)

N85-26681# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

A COMPUTER PROGRAM FOR THE DRAG PREDICTION OF SUBSONIC, TURBINE POWERED AIRCRAFT IN THE EN-ROUTE CONFIGURATION

E. Torenbeek, C. Vermeulen, and G. H. Berenschot Dec. 1983 46 p refs

(VTH-LR-412) Avail: NTIS HC A03/MF A01

A computer program written in FORTRAN 77, for calculating drag polars of gas turbine powered aircraft in the en-route configuration is presented. The method includes a correction for compressibility effects. Applications to several civil aircraft (business and transport aircraft, turboprop and turbofan powered) are presented. They suggest that the low-speed polar is accurate within 10 to 15 counts, for normally used CL values. The drag polars with compressibility effects appear realistic for small angles of attack only.

Author (ESA)

N85-26682# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

A CURVED TEST SECTION FOR RESEARCH ON TRANSONIC SHOCK WAVE-BOUNDARY LAYER INTERACTION

C. Nebbeling and W. J. Bannink Jan. 1984 30 p refs

(VTH-LR-414) Avail: NTIS HC A03/MF A01

A nozzle with a curved test section for a blowdown wind tunnel was designed to generate a transonic flow to investigate shock wave-boundary layer interaction on a convex curved wall at the lower side of the test section. The Mach number at the lower wall just in front of the shock wave may be varied between 1.2 and 1.45. The Mach number at the concave upper wall is < or = 0.85. Measurements show the usefulness of the application of a simple one-dimensional analysis to determine the cross-sectional area distribution of the nozzle, the Mach number, and pressure distribution in front of the shock wave, and the dimensions of the downstream choke area.

Author (ESA)

N85-26683# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
NUMERICAL SOLUTION OF TRANSONIC NORMAL SHOCK WAVE-BOUNDARY LAYER INTERACTION USING THE BOHNING-ZIEROP MODEL
B. Koren and W. J. Bannink Jan. 1984 35 p refs
(VTH-LR-416) Avail: NTIS HC A03/MF A01

A numerical method for transonic shock wave-boundary layer interaction on a plane wall or on a convex wall, based on the Bohning-Zierep (BZ) model where a turbulent boundary layer is perturbed by a weak normal shock wave that exists in the external flow is described. The flow region along the wall is divided into a relatively thick upper layer, where the flow is considered to be inviscid and rotational, and a thin sublayer where the flow is viscous. The problem of the diffusion inside these layers of the jumps in flow quantities across the shock wave is solved without the practical disadvantages of the BZ method. Compared to experiments, good agreement is obtained if the Mach number in front of the shock wave does not exceed unity too much.
Author (ESA)

N85-26613# National Aerospace Lab., Tokyo (Japan).
COMPUTER SOFTWARE FOR AERODYNAMIC DESIGN OF AIRCRAFT DEVELOPED WITHIN THE NATIONAL AEROSPACE LABORATORY
Hiroshi Endo *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 7-16 refs In JAPANESE (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26623# National Aerospace Lab., Tokyo (Japan).
NUMERICAL EXAMPLE OF THREE-DIMENSIONAL FLYING OBJECT IN SHOCKLESS TRANSONIC FLOW
Masayoshi Nakamura *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 101-107 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26624# National Aerospace Lab., Tokyo (Japan).
NAVIER-STOKES SOLUTION OF HYPERSONIC BLUNT-NOSED BODY FLOWFIELDS
Yukimitu Yamamoto *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 109-122 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26626# Kyoto Technical Univ. (Japan).
RECENT PROGRESS IN COMPUTATIONAL AERODYNAMICS
Nobuyuki Satofuka *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 130-139 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26628# Fuji Heavy Industries Ltd., Utsunomiya (Japan).
COMPARISON OF COMPUTATIONAL RESULTS OF A FEW REPRESENTATIVE THREE-DIMENSIONAL TRANSONIC POTENTIAL FLOW ANALYSIS PROGRAMS
Kohei Tanaka and Hideo Hirose *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 157-167 refs In JAPANESE (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26632# National Aerospace Lab., Tokyo (Japan).
THREE-DIMENSIONAL WING BOUNDARY LAYER ANALYSIS PROGRAM BLAY AND ITS APPLICATION
Kenichi Matsuno and Tomiko Ishiguro *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 207-218 refs In JAPANESE (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-27725 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
NEW FLOW PHYSICAL ASPECTS IN AERODYNAMICS [NEUE STROEMUNGSPHYSIKALISCHE ASPEKTE IN DER AERODYNAMIK]
Ernst Heinrich Hirschel *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 11-21 In GERMAN (For primary document see N85-27724 16-81)
(MBB-FE-122/S/PUB/133) Avail: Issuing Activity

N85-26652# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany).
WIND MODELLING FOR INCREASED AIRCRAFT OPERATIONAL EFFICIENCY
W. Lechner and R. Onken *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 12 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-27059# Joint Publications Research Service, Arlington, Va.
FLOW AROUND ROTATING AND NONMOVING CIRCULAR CYLINDER NEAR FLAT SCREEN. REPORT 1: AERODYNAMIC FORCES IN CYLINDER Abstract Only
V. M. Kovalenko, N. M. Bychkov, G. A. Kisel, and N. D. Dikovskaya *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 52-53 Transl. into ENGLISH from Izv. Sib. Otd. Akad. Nauk SSSR, Ser. Tekhn. Nauk (Novosibirsk, USSR), ser. 3, no. 13, Oct. 1983 p 50-59 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27060# Joint Publications Research Service, Arlington, Va.
PARAMETRIC STUDY OF AUTOOSCILLATION UPON FLOW OF SUPERSONIC JET INTO CYLINDRICAL CAVITY Abstract Only
V. N. Glaznev, A. V. Solotchin, and Sh. Suleymanov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 53 Transl. into ENGLISH from Izv. Sib. Otd. Akad. Nauk SSSR, Ser. Tekhn. Nauk Novosibirsk, USSR), ser. 3, no. 13, Oct. 1983 p 22-26 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27061# Joint Publications Research Service, Arlington, Va.
STUDY OF STRESSES ON SURFACE OF FLAT BARRIER IMMERSED IN UNDER EXPANDED JET OF RAREFIED GAS Abstract Only
B. F. Panov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 54 Transl. into ENGLISH from Vest. Leningradskogo Univ. (Leningrad), ser. 19, no. 4, Oct. 1983 p 78-83 Original document previously announced as A84-15763 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27063# Joint Publications Research Service, Arlington, Va.
HYPERSONIC NONEQUILIBRIUM GAS FLOW PAST ZERO-ASPECT WING Abstract Only
A. I. Golubinskiy and V. N. Golubkin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 56 Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Mekh. Zhidkosti i Gaza (Moscow), no. 6, Jun. 1983 p 125-128 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N85-26684 Department of the Navy, Washington, D. C.
TORSO RESTRAINT SYSTEM Patent
D. L. Lorch, inventor (to Navy) Issued 18 Dec. 1984 7 p Supersedes AD-D010207

(AD-D011609; US-Patent-4,488,691; US-Patent-Appl-SN-453444; US-Patent-Class-244-151) Avail: US Patent and Trademark Office CSCL 01/3

This patent discloses a harness system for releasably restraining the torso of a crewman in a set aboard an aircraft. The harness system includes an upper torso restraint adapted to engage the seat at points on either side thereof and wherein a pair of chest straps connected to either side of a backpad are slidingly routed through respective roller fittings in a criss-cross fashion across the crewman to permit upper torso rotation. A separate lower torso restraint is coupled to the upper torso restraint and adapted to engage the seat at the same points of engagement as the upper torso restraint. A single-action release mechanism, actuated manually or automatically by water immersion, disengages both the upper and lower restraints from the seat thereby divesting the crewman of the harness system. GRA

N85-26685# Committee on Public Works and Transportation (U.S. House).

THE IMPACT OF WEATHER ON AVIATION SAFETY

Washington GPO 1984 722 p Hearings before the Subcomm. on Invest. and Oversight of the Comm. on Public Works and Transportation, 98th Congr., 1st Sess., 24, 26 Mar., 19-20 May 1981 and 18 Aug., 6-7 Dec. 1983

(GPO-35-520) Avail: Subcommittee on Investigations and Oversight

Hearings were conducted and testimony heard on the role of weather as a casual or serious factor in air carrier accidents. Federal Aviation Administration and National Weather Service weather detection and reporting capabilities were examined.G.L.C.

N85-26686# National Transportation Safety Board, Washington, D. C.

AIRCRAFT ACCIDENT REPORT: UNITED AIRLINES FLIGHT 663, BOEING 727-222, N7647U, DENVER, COLORADO, MAY 31, 1984

21 Mar. 1985 78 p

(PB85-910405; NTSB/AAR-85/05) Avail: NTIS HC A05/MF A01

On May 31, 1984, at 1334 m.d.t., United Airlines Flight 663, a Boeing 727, struck the localizer antenna 1,074 feet beyond the departure end of runway 35L during takeoff at Stapleton International Airport, Denver, Colorado. There were no injuries, but the airplane sustained substantial airframe damage when it struck the antenna. The National Transportation Safety Board determines that the probable cause of the accident was an encounter with severe wind shear from microburst activity following the captain's decision to take off under meteorological conditions conducive to severe wind shear. Factors which influenced his decisionmaking include: (1) the limitations of the low level wind shear alert system to provide readily usable shear information, and the incorrect terminology used by the controller in reporting this information; (2) the captain's erroneous assessment of a wind shear report from a turboprop airplane and the fact that he did not receive a wind shear report from a departing airplane similar to his airplane because of congestion on the air traffic control radio frequency; (3) successful takeoffs made by several other air carrier airplanes in sequence; and (4) the captain's previous experience operating successfully at Denver under wind shear conditions. Author

N85-26687*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

COMPARISON OF WIND VELOCITY IN THUNDERSTORMS DETERMINED FROM MEASUREMENTS BY A GROUND-BASED DOPPLER RADAR AND AN F-106B AIRPLANE

J. W. Usry, R. Earl Dunham, Jr., and J. T. Lee (NOAA, Norman, Okla.) Apr. 1985 39 p refs

(NASA-TM-86348; L-15875; NAS 1.15:86348) Avail: NTIS HC A03/MF A01 CSCL 01C

As a part of the NASA Storm Hazards Program, the wind velocity in several thunderstorms was measured by an F-106B instrumented airplane and a ground-based Doppler radar. The results of five airplane penetrations of two storms in 1980 and six penetrations of one storm in 1981 are given. Comparisons were made between the radial wind velocity components measured by the radar and the airplane. The correlation coefficients for the 1980 data and part of the 1981 data were 0.88 and 0.78, respectively. It is suggested that larger values for these coefficients may be obtained by improving the experimental technique and in particular by slaving the radar to track the airplane during such tests. R.J.F.

N85-26688# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

IMPROVING INFLIGHT NEGATIVE Gz RESTRAINT FOR AIRCREWMEN Final Report

D. Lorch Aug. 1984 43 p

(AD-A151909; NADC-84114-60) Avail: NTIS HC A03/MF A01 CSCL 01/3

Inadequate negative Gz restraint has been cited as a factor preventing pilots from recovering control of their aircraft after a departure from positive G maneuvers. Several prototype XV seat-mounted harnesses were designed and tested to determine if they might provide improved inflight restraint. Although they were able to improve restraint, none of them could meet the rigid and conflicting demands which were imposed. The restraint which met most of the requirements was the MA-2 Torso Harness with the addition of a seat-mounted Y shoulder strap. The Y strap reduced average head displacement to about one-third of its former value (from 6cm to 2cm for a 50% subject at -1Gz). No problems were uncovered during seat/man separation tests, and the Y strap did not restrict upper torso rotation. GRA

N85-26689# Oak Ridge National Lab., Tenn.

GENERALIZED ESCAPE SYSTEM SIMULATION: ITS PURPOSE, RECENT MODIFICATIONS AND POTENTIAL

G. E. Liepins and S. Y. Ohr 1984 5 p Presented at the SAFE Association Meeting, Las Vegas, Nev., 9 Dec. 1984

(Contract DE-AC05-84CR-21400)

(DE85-005571; CONF-841257-1) Avail: NTIS HC A02/MF A01

The Generalized Escape System Simulation (GESS) model and recent modifications expected to contribute to a more useful AAES/AISS in-service usage data analysis system are discussed. the GESS code was developed for CDC hardware from various precursor codes by the Naval Air Development Center (NADC), and was recently transcribed to IBM compatibility by Oak Ridge National Laboratory. The capabilities of the GESS code, the needs that are expected to be met by the transcribed IBM version, longer-range modifications, and the expected benefits resulting from the transcribed IBM version both to the Crew Systems Division, Naval Air Systems Command, and the AAES community in general are discussed. DOE

N85-26690# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction de la Physique Generale.

LIGHTNING STRIKES ON AIRCRAFT. THE TRIP 82 EXPERIMENT AND 3-DIMENSIONAL ELECTROMAGNETIC INTERFEROMETRY Final Report [FOUDROIEMENT DES AERONEFS. EXPLOITATION TRIP 82. INTERFEROMETRIE ELECTROMAGNETIQUE A 3 DIMENSIONS]

P. Laroche, P. Richard, G. Labaune, S. Larigaldie, J. Appel, F. Dunand, J. Marcault, F. Broutet, and J. L. Boulay Sep. 1984 238 p refs In FRENCH

(Contract DRET-83/34.123)

(ONERA-RF-88/7154-PY) Avail: NTIS HC A11/MF A01

The electrical properties of triggered lightning and its effects on aircraft were studied using a hemispherical ended cylinder that simulated an aircraft fuselage when struck by lightning. The triggering system used the wire and rocket technique. Current, light emitted, magnetic fields and distant VHF radiation were measured. Triggered flashes, in particular flashes that deviate from the evaporated wire, exhibit a behavior close to that of naturally occuring upward initiated discharges. This makes triggering a powerful tool for all lightning studies. Author (ESA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N85-26691*# Analytical Mechanics Associates, Inc., Mountain View, Calif.

NAVIGATION AND FLIGHT DIRECTOR GUIDANCE FOR THE NASA/FAA HELICOPTER MLS CURVED APPROACH FLIGHT TEST PROGRAM

A. V. Phatak and M. G. Lee May 1985 133 p refs

(Contract NAS2-10850)

(NASA-CR-177350; NAS 1.26:177350) Avail: NTIS HC A07/MF A01 CSCL 17G

The navigation and flight director guidance systems implemented in the NASA/FAA helicopter microwave landing system (MLS) curved approach flight test program is described. Flight test were conducted at the U.S. Navy's Crows Landing facility, using the NASA Ames UH-IH helicopter equipped with the V/STOLAND avionics system. The purpose of these tests was to investigate the feasibility of flying complex, curved and descending approaches to a landing using MLS flight director guidance. A description of the navigation aids used, the avionics system, cockpit instrumentation and on-board navigation equipment used for the flight test is provided. Three generic reference flight paths were developed and flown during the test. They were as follows: U-Turn, S-turn and Straight-In flight profiles. These profiles and their geometries are described in detail. A 3-cue flight director was implemented on the helicopter. A description of the formulation and implementation of the flight director laws is also presented. Performance data and analysis is presented for one pilot conducting the flight director approaches. Author

N85-26692# Federal Aviation Administration, Washington, D.C.

NATIONAL AIRSPACE SYSTEM PLAN: FACILITIES, EQUIPMENT AND ASSOCIATED DEVELOPMENT

Apr. 1985 358 p

Avail: NTIS HC A16/MF A01

The National Airspace System (NAS), a mixture of equipment, techniques, and skills that evolved over 40 years is discussed. Improvements in the systems are outlined. The need to accommodate safely the increasing demand for aviation services, constrain costs, and solve the problems of aging facilities is emphasized. The specific improvements required long-term capabilities, and the planned system evolution remains essentially unchanged from previous editions. However, four new projects were added. The FAA has put in place a formal and disciplined management process to monitor and control schedules and costs of the NAS Plan. The NAS system requirements specification for the NAS and the system-level design are documented, baselined, and placed under configuration control. Risk areas in the program are identified, and SEI technical resources are applied to assist NAS projects in achieving milestone schedules. The new program management controls, SEI resources in place, and most of the major contracts awarded, the outlook is very favorable for the successful execution of the NAS Program Plan. E.A.K.

N85-26693# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AUTOFOCUS MOTION COMPENSATION FOR SYNTHETIC APERTURE RADAR AND ITS COMPATIBILITY WITH STRAPDOWN INERTIAL NAVIGATION SENSORS ON HIGHLY MANEUVERABLE AIRCRAFT M.S. Thesis

H. D. Baird, Jr. Dec. 1984 56 p

(AD-A151940; AD-E751114; AFIT/GA/ENG/84D-1) Avail: NTIS HC A04/MF A01 CSCL 17/9

This thesis investigated the feasibility of using state-of-the-art strapdown inertial navigation systems to motion compensate synthetic aperture radar aboard highly maneuverable aircraft. The applicable equations were first derived to obtain a comparison between inertial navigation system capabilities and synthetic aperture radar motion compensation requirements. Both turned gyro and laser gyro systems were investigated to determine the applicability for the task. The autofocus motion compensation technique was studied to determine if its range and squint angle boundaries could be improved by the use of highly accurate strap-down inertial navigation system measurements. It was determined that state-of-the-art strapdown inertial systems have the capability to motion compensate synthetic aperture radars in maneuvering aircraft and can improve the range and squint angle boundaries using the autofocus motion compensation technique. The results illustrate the ability of tactical aircraft to obtain high resolution imagery, as well as navigation and target information, while maintaining the low life-cycle cost of strapdown technology. GRA

N85-26694# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

GENERATION OF FLIGHT PATHS USING HEURISTIC SEARCH M.S. Thesis

C. S. Lizza 1984 112 p

(AD-A151949; AFIT/CI/NR-85-17T) Avail: NTIS HC A06/MF A01 CSCL 12/1

This thesis examines a solution to the problem of developing an effective, computer algorithm to route aircraft through hostile enemy defenses. The problem was proposed to assist in studies of the impact of varied, on-board countermeasures upon preplanned aircraft routes. The quality of a route can be defined in terms of the cost of interaction between the aircraft and threats encountered along the path, and the length of the path. Current methods of automated routing are either inefficient or produce unsatisfactory results. Given a more general description of the problem, this thesis details a solution for developing routes by using the artificial intelligence technique of heuristic search in an A* algorithm. The algorithm uses heuristics based upon estimates of the degree of threat interactivity and distance from a point to the goal. Due to the nature of the heuristic, the A* algorithm cannot guarantee development of a least-cost path. However, the heuristic may be adjusted to insure reasonably good results in most cases. Test cases confirm improvements in efficiency while maintaining solution quality comparable to previous methods. The flexibility of the algorithm allows applicability to the specific aircraft routing problem and to other route planning applications. Author (GRA)

N85-26695# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A REPLENISHMENT PHASE STUDY FOR THE NAVSTAR GLOBAL POSITIONING SYSTEM M.S. Thesis

D. J. Aderhold Dec. 1984 120 p

(AD-A152030; AFIT/GSO/ENS/84D-1) Avail: NTIS HC A06/MF A01 CSCL 17/7

A Q-GERT simulation model was designed to estimate the replenishment phase for the Global Positioning System using the original block buy of 28 satellites. Block 1 satellites were not considered in the study. The model determines the best fixed launch schedule without replenishment to find out when the initial constellation falls below 18 satellites. Additionally, the model was modified to determine the best fixed launch schedule that would maintain the constellation at 21 functional satellites 99% of the time. Sensitivity analysis was performed on the parameters of satellite design life and reliability through final orbit insertion. Satellite availability curves were used to show the number of operational satellites over time. Point availability curves were used to display the fraction of 21 satellites available each month of operation. A satellite attrition analysis was performed by selecting up to three satellites for deletion and evaluating coverage over the major land areas. GRA

N85-26696# Naval Postgraduate School, Monterey, Calif.

AN INVESTIGATION INTO THE CONTROL LIMITATIONS OF A

BANK TO TURN MISSILE IN THE TERMINAL HOMING PHASE M.S. Thesis
B. P. Anderson Sep. 1984 206 p
(AD-A152193) Avail: NTIS HC A10/MF A01 CSCL 17/7

The purpose of this thesis was to examine guidance and control deficiencies in a bank to turn (BTT) cruise missile with limited roll authority in the terminal homing phase of its mission. A six degree of freedom simulation of a typical BTT missile was translated into FORTRAN H from the Continuous System Modelling Program (CSMP) simulation language and run on the IBM System 370 computer. Tests were conducted with the revised simulation program to examine the effects of electronic countermeasures (ECM) blinking and glint upon the missile's control system and accuracy against a simulated medium sized combatant vessel traveling at 20 knots perpendicular to the missile's track over the Earth. In addition to the standard attack profile involving a popout attack, several other attack profiles were tested including skid-to-turn (STT) control laws and a ballistic trajectory. Miss distances varied from 3.7 feet without ECM or glint to 85 feet with ECM operating. Susceptibility of the missile to ECM blinking varied with the blinking frequency. The largest miss distances occurred with ECM frequencies below 0.2 Hz and near 6.0 Hz. GRA

N85-26697# Naval Postgraduate School, Monterey, Calif.
CRITERIA FOR THE CLASSIFICATION OF HYDROGRAPHIC POSITIONING DATA M.S. Thesis
N. E. Perugini Sep. 1984 96 p
(AD-A152283) Avail: NTIS HC A05/MF A01 CSCL 17/7

Two methods for evaluating the accuracy of hydrographic positioning data are presented. One method consists of classifying each position in a survey based on the radius of the 90 percent confidence circle. The second method involves classification of positions based on the parameters of the 90 percent confidence ellipse. Both methods are based on geometric and statistical relationships between intersecting lines of position. Range-range, azimuth-azimuth, and range-azimuth positioning data are classified using both criteria. For noncritical positions, the confidence circle method is found to be preferable due to its ease of interpretation. For positions of significant features, such as underwater hazards, the confidence ellipse provides a more useful representation of the shape and orientation of the true error distribution. The concept of presurvey positioning design is also presented. With the aid of computer graphic displays, the hydrographer can predict the accuracy of offshore positioning data prior to data acquisition. By analyzing accuracy lobes generated about shore stations, a survey can be designed to meet given specifications. GRA

N85-26640# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).
COMBINATORIAL PERFORMANCE/COST ANALYSIS OF AN AUTONOMOUS NAVIGATION SYSTEM FOR AIRCRAFT [ANALYSE COMBINATOIRE PERFORMANCES/COUTS DUN SYSTEME AUTONOME DE NAVIGATION POUR AERONEFS]
P. Lloret and G. Lavoipierre *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 12 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26641# Marconi Avionics Ltd., Rochester (England).
NAVIGATION: ACCOUNTING FOR COPY
Derrick J. Hamlin *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 11 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26646# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).
PREGUIDANCE AND PILOTING WITH THE AID OF COMPOSITE INERTIAL SENSORS [PREGUIDAGE ET PILOTAGE A LAIDE DE SENSURS INERTIELS COMPOSITES]
J. Resseguier *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 15 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26648# Smiths Industries Ltd., Bishops Cleeve (England).
THE SERIES 2000: A MINIATURE GAS BEARING DTG FOR LOW COST STRAPDOWN GUIDANCE AND CONTROL
G. Beardmore *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 14 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26650# Societe Crouzet, Valence (France).
THE USE OF A SELF-COMPENSATED MAGNETOMETER IN AN ECONOMICAL NAVIGATION SYSTEM FOR THE HELICOPTER [UTILISATION DUN MAGNETOMETRE AUTOCOMPENSE DANS UN SYSTEME DE NAVIGATION ECONOMIQUE POUR HELICOPTERE]
J. L. Roch, J. C. Goudon, and Ph. Chaix *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 10 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26659# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
TERRAIN FOLLOWING WITHOUT USE OF FORWARD LOOKING SENSORS
H. F. Schwegler and B. Schreiner *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 3 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26661# Ferranti Defence Systems Ltd., Edinburgh (Scotland).
LOW COST TWO GIMBAL INERTIAL PLATFORM AND ITS SYSTEM INTEGRATION
R. N. Priestley and J. B. Towler *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 14 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-27105*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAINTENANCE OF TIME AND FREQUENCY IN THE DSN USING THE GLOBAL POSITIONING SYSTEM
P. A. Clements, A. Kirk, and S. E. Borutzki *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 94-108 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 17G

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N85-26698 Illinois Univ., Urbana-Champaign.
ROTOR BLADE FLAP-LAG STABILITY AND RESPONSE IN FORWARD FLIGHT IN TURBULENT FLOWS Ph.D. Thesis
Ting-Nung Bernard Shiau 1984 178 p
Avail: University Microfilms Order No. DA8502297

The effect of random air turbulence on the coupled flap-lag motion of a licopter rotor blade in forward flight was investigated. By assuming white noise turbulence and applying a special case of the stochastic averaging procedure, equations are developed which describe the stochastic first and second moments of the perturbations in flap and lead-lag angles due to turbulence. Numerical results for stability in forward flight illustrate that turbulence exhibits a stabilizing effect, compared to the deterministic (no turbulence) case. Results for the steady-state responses of the perturbations indicated that the average response of the blade is not significantly affected by turbulence. In contrast, the

random fluctuations away from the average response exhibit significantly large values due to the effects of turbulence. The effects of various blade parameters on the steady-state response are also investigated. The stability of multibladed rotors in the presence of turbulence is investigated using the example of a three-bladed rotor. The constant coefficient approximation using multiblade coordinates is shown to be accurate for moderate advance ratio in the case of a trimmed rotor. For an untrimmed rotor the approximation is less accurate and provides very conservative stability boundaries. Dissert. Abstr.

N85-26699*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FORMULATION AND IMPLEMENTATION OF NONSTATIONARY ADAPTIVE ESTIMATION ALGORITHM WITH APPLICATIONS TO AIR-DATA RECONSTRUCTION
Stephen A. Whitmore May 1985 11 p refs Presented at the IEEE Natl. Aerospace and Electron. Conf., Dayton, Ohio, 20-24 May 1985
(NASA-TM-86727; H-1285; NAS 1.15:86727) Avail: NTIS HC A02/MF A01 CSCL 01C

The dynamics model and data sources used to perform air-data reconstruction are discussed, as well as the Kalman filter. The need for adaptive determination of the noise statistics of the process is indicated. The filter innovations are presented as a means of developing the adaptive criterion, which is based on the true mean and covariance of the filter innovations. A method for the numerical approximation of the mean and covariance of the filter innovations is presented. The algorithm as developed is applied to air-data reconstruction for the space shuttle, and data obtained from the third landing are presented. To verify the performance of the adaptive algorithm, the reconstruction is also performed using a constant covariance Kalman filter. The results of the reconstructions are compared, and the adaptive algorithm exhibits better performance. A.R.H.

N85-26700# Naval Postgraduate School, Monterey, Calif.
DETERMINATION OF QUANTITATIVE RELATIONSHIPS BETWEEN SELECTED CRITICAL HELICOPTER DESIGN PARAMETERS M.S. Thesis
R. S. Petricka Sep. 1984 354 p
(AD-A152034) Avail: NTIS HC A16/MF A01 CSCL 01/3

This thesis determines the relationships of helicopter design parameters by first depicting graphically all possible pairings of selected design parameter values and then, secondly, depicting graphically respective curve fits for the data point plots which meet an acceptance criteria. In generating the curve plots, the specific constants of each curve equation are determined, thus allowing the designer the ability to derive quantitatively the values of many of the design parameters heretofore selected by trial and error methods. GRA

N85-26701# Michigan Univ., Ann Arbor. Dept. of Mechanical Engineering and Applied Mechanics.
A FEASIBILITY STUDY FOR USING LOW BOILING POINT FLUIDS TO CHANGE AIRCRAFT TIRE DEFLECTION Final Report, Aug. 1983 - Oct. 1984
Sam K. Clark and Richard C. Dodge Wright-Patterson AFB, Ohio AFWAL Feb. 1985 20 p
(Contract F33615-83-C-3409)
(AD-A152096; AFWAL-TR-84-3111) Avail: NTIS HC A02/MF A01 CSCL 01/3

An investigation carried out over a one year period showed that the use of small quantities of low boiling point liquids in the cavity of an aircraft tire results in a faster pressure rise than would be the case if the liquid were absent. This effect causes a correspondingly greater decrease in tire deflection, with less heat generation. This effect is most pronounced as significant heat is generated in the tire, typical of long taxi distances on the order of 15,000 feet or greater. At shorter or normal operational taxi lengths, less than 10,000 feet, the effect is not significantly pronounced and does not yield the required stable, safe, and typical operational values of tire deflection. Hence, the proposed concept as a self healing solution to the problem of excessive heat generation during high flotation operations appears to be infeasible. GRA

N85-26702# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
STUDY OF LONGITUDINAL LANDING FLYING QUALITIES EVALUATION USING PILOT MODEL THEORY M.S. Thesis
E. D. DiDomenico 1 Dec. 1984 219 p
(AD-A152194; AFIT/GE/ENG/84D-14) Avail: NTIS HC A10/MF A01 CSCL 01/2

Control Anticipation Parameter used as a longitudinal handling qualities criterion does not adequately distinguish between different flight phases. Recent flight test data from the Landing Approach Higher Order Systems (LAHOS) study further indicate the inadequacy of the second order approximation for higher order longitudinal landing flying qualities. Nine aircraft that fall within the Level 1 boundary reveal pilot ratings ranging from 1.5 to 10. These nine aircraft are studied be combining their longitudinal dynamics with pilot modelling to examine a better method of landing flying quality prediction and evaluation. Pilot model theory (cross-over pilot model) is successfully combined with classical root locus and frequency response techniques to establish a frequency separation criterion called Loop Separation Parameter (LSP). Landing longitudinal evaluation and pilot rating predictions are consistent using the LSP method. In this thesis LSP is defined as the difference in resonant frequencies in pitch attitude and flight path angle control loops (with a pilot in each loop). Very acceptable prediction of pilot ratings (Cooper/Harper scale) along with PIO frequencies are demonstrated using the LSP method. LSP can also be used as an measurement technique to estimate pilot lead (a linear pilot model parameter). The landing test data also indicates an apparent transition of pilot emphasis from pitch control to flight path angle control in the landing flare. Time series analysis were performed on two example aircraft to validate LSP theory independently. The theory developed is applied to estimate pilot ratings for the X-29A longitudinal mode flying qualities. GRA

N85-26703# Grumman Aerospace Corp., Bethpage, N.Y.
ESP (EXTERNAL-STORES PROGRAM): A PILOT COMPUTER PROGRAM FOR DETERMINING FLUTTER-CRITICAL EXTERNAL-STORE CONFIGURATIONS. VOLUME 3, PART 2. PROGRAM COMPILATION
J. B. Smedfjeld Feb. 1985 695 p
(Contracts N00019-81-C-0395; N00019-84-C-0123)
(AD-A152271; AD-E801100; ADCR-85-1-Vol-3-Pt-2) Avail: NTIS HC A99/MF A02 CSCL 09/2

The 145 subroutines for determining flutter-critical external-store configurations are contained. B.G.

N85-26704# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
PROTECTIVE COATINGS FOR AIRCRAFT STRUCTURES: A REVIEW
W. A. J. Moonen Dec. 1983 155 p refs
(VTH-LR-413) Avail: NTIS HC A08/MF A01

The technology and properties of aircraft anticorrosion metal coatings, oxide films on aluminum, conversion coatings for aluminum, paint systems, water displacing corrosion inhibitors, and corrosion inhibitive sealants are summarized. Author (ESA)

N85-26622# Mitsubishi Heavy-Industries Ltd., Tokyo (Japan).
COMPUTATIONAL AERODYNAMICS IN DESIGNING AIRCRAFT
Michi-aki Kono *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 91-100 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26627# Mitsubishi Heavy-Industries Ltd., Nagoya (Japan).
COMPUTATIONAL AERODYNAMICS FOR AIRCRAFT WING DESIGN
Tadayuki Tanioka *In* National Aerospace Lab. Proc. of the NAL

Symp. on Aircraft Computational Aerodyn. 1983 p 141-155 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26631# National Aerospace Lab., Tokyo (Japan).
A NUMERICAL DESIGN METHOD FOR THREE-DIMENSIONAL TRANSONIC WINGS
Susumu Takanashi *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 199-205 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-27728 Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
THE APPLICATION OF COMPUTER AIDED STRUCTURAL OPTIMIZATION TO THE DESIGN OF AIRCRAFT COMPONENTS [ANWENDUNG DER RECHNERGESTUETZTEN STRUKTUROPTIMIERUNG BEI DER AUSLEGUNG VON FLUGZEUGBAUTEILEN]
Heinrich Wellen *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 61-68 refs In GERMAN Presented at DGLR-Fachausschusssitzung Festigkeit u. Bauweisen, Neubiberg, West Germany, 5 Jul. 1984 (For primary document see N85-27724 16-81)
(MBB-UT-21/84-O) Avail: Issuing Activity

N85-27730 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Flight Test Dept.
FLIGHT TEST SUPPORT AIRCRAFT ADVANCED TECHNOLOGIES TESTING AIRCRAFT SYSTEM (ATTAS) FOR THE DFVLR
Thomas Fleck *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 85-93 Presented at AIAA/AHS/IES/SETP/SFTE/DGLR 2nd Flight Testing Conf., Las Vegas, Nev., 16-18 Nov. 1983 (For primary document see N85-27724 16-81)
(MBB-FE-732/S/PUB/154) Avail: Issuing Activity

N85-27735 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Marine and Special Products Div.
THE PINGUIN B3: A REMOTELY PILOTED VEHICLE FOR MINE IDENTIFICATION AND DISPOSAL
P. Gehrke *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 287-299 Presented at Intern. Symp. on Mine Warfare Vessels and Systems, London, 12-15 Jun. 1984 (For primary document see N85-27724 16-81)
(MBB-UM-1/84-O) Avail: Issuing Activity

N85-27736 Messerschmitt-Boelkow-Blohm G.m.b.H., Hamburg (West Germany). Unternehmensbereich Transport- und Verkehrsflugzeuge.
UTILIZATION OF AN AUTOMATED RIVETING SYSTEM IN AIRCRAFT CONSTRUCTION [EINSATZ VON AUTOMATISIERTEN NIETANLAGEN IM FLUGZEUBAU]
Juergen Maskow *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 301-307 In GERMAN Presented at Jahrestagung der DGLR, Hamburg, 1-3 Oct. 1984 (For primary document see N85-27724 16-81)
(MBB-UT-11/84-O; DGLR-84-087) Avail: Issuing Activity

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N85-26705*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PLANNING FUEL-CONSERVATIVE DESCENTS IN AN AIRLINE ENVIRONMENTAL USING A SMALL PROGRAMMABLE CALCULATOR: ALGORITHM DEVELOPMENT AND FLIGHT TEST RESULTS
Charles E. Knox, Dan D. Vicroy, and David A. Simmon (United Airlines, Inc., Chicago) May 1985 77 p refs
(NASA-TP-2393; L-15844; NAS 1.60:2393) Avail: NTIS HC A05/MF A01 CSCL 01D

A simple, airborne, flight-management descent algorithm was developed and programmed into a small programmable calculator. The algorithm may be operated in either a time mode or speed mode. The time mode was designed to aid the pilot in planning and executing a fuel-conservative descent to arrive at a metering fix at a time designated by the air traffic control system. The speed model was designed for planning fuel-conservative descents when time is not a consideration. The descent path for both modes was calculated for a constant with considerations given for the descent Mach/airspeed schedule, gross weight, wind, wind gradient, and nonstandard temperature effects. Flight tests, using the algorithm on the programmable calculator, showed that the open-loop guidance could be useful to airline flight crews for planning and executing fuel-conservative descents. M.G.

N85-26706# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
A COMPARISON OF PICTORIAL AND SPEECH WARNING MESSAGES IN THE MODERN COCKPIT M.S. Thesis
C. P. Robinson Dec. 1984 156 p
(AD-A151917; AFIT/CI/NR-85-23T) Avail: NTIS HC A08/MF A01 CSCL 09/3

This thesis presents a current trend in cockpit design to incorporate synthesized speech to present secondary information to the pilot in an attempt to reduce mental workload, and to allow the pilot to keep his or her view out of the cockpit. Theories of multiple resource information processing support both of these reasons to use synthesized speech, but theories of stimulus-central processing-response (S-C-R) compatibility suggest the possibility that spatial information presented visually may have some distinct advantages over speech even though it uses the same input modality as the primary (flying) task. If the response is to be manual, then spatial information is more compatible. Twenty subjects participated in three dual-task experiments which compared tracking and emergency response performance when information was presented in the visual/spatial (pictorial) mode as opposed to the auditory/verbal (speech) mode. In all three experiments the pictorial mode elicited quicker response times, though in one experiment the pictorial mode also elicited more errors. Also, the pictorial subjects improved more with learning than did the speech subjects. While the subjects were not successful at protecting their primary task when they added the secondary task, there were no interactions between the task type and any other factor. These results indicate that more research concerning the spatial advantages of pictorial displays needs to be conducted before too many speech displays are incorporated into the cockpit. GRA

N85-26707# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
AVIONICS INTEGRITY ISSUES PRESENTED DURING NAECON (NATIONAL AEROSPACE AND ELECTRONICS CONVENTION) 1984 Final Report, 21 May - 25 May 1984
H. C. Fortna, ed. Dec. 1984 172 p
(AD-A151923; ASD-TR-84-5030) Avail: NTIS HC A08/MF A01 CSCL 09/5

This report summarizes the failure modes (chemical, mechanical, or thermal) which reduce the operational life of avionic and electronic equipment. Lt. Gen. Thomas H. McMullen's speech at Tuesday's luncheon summarized the history of avionics and presents the great importance of avionics to the future of Aircraft. The notes from the management session, ASD Integrity Thrusts, discuss the important aspects of avionics integrity in design, manufacturing, and use. The important role people play in the development and manufacturing of an electronic product is shown. Stress screening of electronic components is important to having quality equipment and is discussed from the government's perspectives of maintenance and supply as well as from the view of the Institute of Environmental Sciences (IES). GRA

N85-26708# Army Aviation Engineering Flight Activity, Edwards AFB, Calif.
PRELIMINARY AIRWORTHINESS EVALUATION OF A NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTOMATED STALL WARNING SYSTEM FOR AN OV-1 AIRCRAFT Final Report, 5 Dec. 1983 - 1 May 1984
D. L. Underwood and R. S. Adler Jul. 1984 61 p
(DA Proj. EN1-Y)
(AD-A152010; USAAEFA-81-06-1) Avail: NTIS HC A04/MF A01 CSCL 01/4

The ASWS is an experimental system independent of conventional angle-of-attack sensors. It incorporates an onboard microcomputer which displays stall warning margin information as a function of computed calibrated airspeed and stall airspeed in real time. The test objective was to evaluate the feasibility of an ASWS an installed in the OV-1 and determine compliance of the system with the requirements of MIL-F-8785C. A limited evaluation of the ASWS was conducted at Edwards AFB, CA from 5 Dec 1983 to 1 May 1984. During the test program 33 flights were conducted. In all conditions and configurations tested, the system provided greatly improved stall warning margins when compared to the aerodynamic stall warnings of the OV-1 series aircraft. Adequate stall warnings were provided in most flight configurations tested and the requirements of MIL-F-8785C were met in 156 of the 164 stalls evaluated. System hysteresis and the effects of sideslip on the stall warning capability of the system were minimal and acceptable. Failure of the ASWS to accurately predict single engine stall airspeeds was identified as a deficiency. Additionally, attenuation of the aural warning cue during radio and interphone communications resulted in decreased crew awareness of impending stall and was a shortcoming. GRA

N85-26645# Singer Co., Wayne, N. J.
DESIGN-TO-COST (DTC) METHODOLOGY TO ACHIEVE AFFORDABLE AVIONICS
Albert J. Shapiro *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 18 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N85-26709*# Detroit Diesel Allison, Indianapolis, Ind. Allison Gas Turbine Div.
ANALYTICAL FUEL PROPERTY EFFECTS--SMALL COMBUSTORS Final Report
R. D. Sutton, D. L. Troth, and G. A. Miles Oct. 1984 224 p refs
(Contract NAS3-23165)
(NASA-CR-174738; EDR-11683; NAS 1.26:174738; AVSCOM-TR-84-C-14) Avail: NTIS HC A10/MF A01 CSCL 21E

The consequences of using broad-property fuels in both conventional and advanced state-of-the-art small gas turbine combustors are assessed. Eight combustor concepts were selected for initial screening, of these, four final combustor concepts were chosen for further detailed analysis. These included the dual orifice injector baseline combustor (a current production 250-C30 engine combustor) two baseline airblast injected modifications, short and piloted prechamber combustors, and an advanced airblast injected, variable geometry air staged combustor. Final predictions employed the use of the STAC-I computer code. This quasi 2-D model includes real fuel properties, effects of injector type on atomization, detailed droplet dynamics, and multistep chemical kinetics. In general, fuel property effects on various combustor concepts can be classified as chemical or physical in nature. Predictions indicate that fuel chemistry has a significant effect on flame radiation, liner wall temperature, and smoke emission. Fuel physical properties that govern atomization quality and evaporation rates are predicted to affect ignition and lean-blowout limits, combustion efficiency, unburned hydrocarbon, and carbon monoxide emissions. Author

N85-26710*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOW-SPEED AERODYNAMIC TEST OF AN AXISYMMETRIC SUPERSONIC INLET WITH VARIABLE COWL SLOT
A. G. Powell (Douglas Aircraft Co., Long Beach, Calif.), H. R. Welge (Douglas Aircraft Co., Long Beach, Calif.), and C. J. Trefny 1985 6 p refs Proposed for presentation at the 21st Joint Propulsion Conf., Monterey, Calif., 8-10 Jul. 1985; sponsored by AIAA, SAE and ASME
(Contract NAS1-16147)
(NASA-TM-87039; E-2595; NAS 1.15:87039; Douglas-Paper-7551) Avail: NTIS HC A02/MF A01 CSCL 21E

The experimental low-speed aerodynamic characteristics of an axisymmetric mixed-compression supersonic inlet with variable cowl slot are described. The model consisted of the NASA P-inlet centerbody and redesigned cowl with variable cowl slot powered by the JT8D single-stage fan simulator and driven by an air turbine. The model was tested in the NASA Lewis Research Center 9- by 15-foot low-speed tunnel at Mach numbers of 0, 0.1, and 0.2 over a range of flows, cowl slot openings, centerbody positions, and angles of attack. The variable cowl slot was effective in minimizing lip separation at high velocity ratios, showed good steady-state and dynamic distortion characteristics, and had good angle-of-attack tolerance. Author

N85-26711*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
EFFECTS OF SURFACE CHEMISTRY ON HOT CORROSION LIFE Annual Report, 2 May 1984 - 2 May 1985
R. E. Fryxell Jun. 1985 47 p refs
(Contract NAS3-23926)
(NASA-CR-174915; NAS 1.26:174915; R85AEB307; AR-2) Avail: NTIS HC A03/MF A01 CSCL 21E

Burner rig tests were conducted under the following conditions: 900 C, hourly thermal cycling, 0.5 ppm sodium as NaCl in the gas stream, velocity 0.3 Mach. The alloys are Udiment 700, Rene 80, uncoated and with RT21, Codep, or NiCoCrAlY coatings. These tests were completed for specimens in the as-processed condition and after aging at 1100 C in oxidizing or inert evnivronments for time up to 600 hours. Coil inductance changes used for periodic nondestructive inspection of specimens were useful in following the course of corrosion. Typical sulfidation was observed in all cases, structurally similar to that observed for service-run turbine components. Aging at cuased a severe decrease in hot corrosion life of RT21 and Codep coatings and a significant but less decrease in the life of the NiCoCrAlY coating. The extent of these decreases was much greater for all three coatings on U700 substrates than on Rene 80 substrates. Coating/substrate interdiffusion rather than by surface oxidation. M.G.

N85-26712*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mechanical Engineering.
THERMODYNAMIC EVALUATION OF TRANSONIC COMPRESSOR ROTORS USING THE FINITE VOLUME APPROACH Semiannual Status Report, 20 Dec. 1985 - 31 May 1985
Stephen Nicholson and John Moore 1985 42 p refs
(Grant NAG3-593)
(NASA-CR-175811; NAS 1.26:175811; JM/85-6) Avail: NTIS HC A03/MF A01 CSCL 21E

Progress made in extending the finite volume explicit time marching method to laminar and turbulent flow during the time period from January to May 1985 is documented. Previously, extensions were made to the finite volume method to improve the accuracy of the calculation of total pressure in compressible inviscid flow. The current work extends these ideas and develops new

ideas which allow the calculation of laminar and turbulent boundary layers in internal flows. The method is verified using four test cases with free-stream Mach numbers ranging from .075 to 1.20. R.J.F.

N85-26713*# Notre Dame Univ., Ind. Dept. of Electrical Engineering.
ALTERNATIVES FOR JET ENGINE CONTROL Technical Progress Report, 1 Nov. 1983 - 31 Oct. 1984
Michael K. Sain 31 Oct. 1984 266 p refs
(Grant NsG-3048)
(NASA-CR-175831; NAS 1.26:175831) Avail: NTIS HC A12/MF A01 CSCL 21E

The technical progress of researches Alternatives for Jet Engine Control is reported. A numerical study employing feedback tensors for optimal control of nonlinear systems was completed. It is believed that these studies are the first of their kind. State regulation, with a decrease in control power is demonstrated. A detailed treatment follows. E.A.K.

N85-26714*# Notre Dame Univ., Ind. Dept. of Electrical Engineering.
ALTERNATIVES FOR JET ENGINE CONTROL Technical Progress Report, 1 Oct. 1982 - 31 Oct. 1983
Michael K. Sain 31 Oct. 1983 140 p refs
(Grant NsG-3048)
(NASA-CR-175832; NAS 1.26:175832) Avail: NTIS HC A07/MF A01 CSCL 21E

The technical progress of researches on alternatives for jet engine control, is reported. The principal new activities involved the initial testing of an input design method for choosing the inputs to a non-linear system to aid the approximation of its tensor parameters, and the beginning of order reduction studies designed to remove unnecessary monomials from tensor-models. E.A.K.

N85-26715*# Notre Dame Univ., Ind. Dept. of Electrical Engineering.
ALTERNATIVES FOR JET ENGINE CONTROL Semiannual Status Report, 1 Nov. 1983 - 30 Apr. 1984
Michael K. Sain 30 Apr. 1984 271 p refs
(Grant NsG-3048)
(NASA-CR-175833; NAS 1.26:175833) Avail: NTIS HC A12/MF A01 CSCL 21E

The technical progress of researches on alternatives for jet engine control is reported. Extensive numerical testing is included. It is indicated that optimal inputs contribute significantly to the process of calculating tensor approximations for nonlinear systems, and that the resulting approximations may be order-reduced in a systematic way. E.A.K.

N85-26716*# Oklahoma State Univ., Stillwater. School of Mechanical and Aerospace Engineering.
CONFINED TURBULENT SWIRLING RECIRCULATING FLOW PREDICTIONS Ph.D. Thesis. Final Report
M. T. Abujelala and D. G. Lilley May 1985 226 p refs
(Grant NAG3-74)
(NASA-CR-174917; NAS 1.26:174917) Avail: NTIS HC A11/MF A01 CSCL 21E

The capability and the accuracy of the STARPIC computer code in predicting confined turbulent swirling recirculating flows is presented. Inlet flow boundary conditions were demonstrated to be extremely important in simulating a flowfield via numerical calculations. The degree of swirl strength and expansion ratio have strong effects on the characteristics of swirling flow. In a nonswirling flow, a large corner recirculation zone exists in the flowfield with an expansion ratio greater than one. However, as the degree of inlet swirl increases, the size of this zone decreases and a central recirculation zone appears near the inlet. Generally, the size of the central zone increased with swirl strength and expansion ratio. Neither the standard k-epsilon turbulence mode nor its previous extensions show effective capability for predicting confined turbulent swirling recirculating flows. However, either reduced optimum values of three parameters in the mode or the empirical C sub mu formulation obtained via careful analysis of available turbulence measurements, can provide more acceptable accuracy in the prediction of these swirling flows. Author

N85-26717*# Oklahoma State Univ., Stillwater. School of Mechanical and Aerospace Engineering.
TURBULENCE CHARACTERISTICS OF SWIRLING FLOW-FIELDS Ph.D. Thesis. Final Report
T. W. Jackson and D. G. Lilley May 1985 266 p refs
(Contract NAG3-74)
(NASA-CR-174918; NAS 1.26:174918) Avail: NTIS HC A13/MF A01 CSCL 21E

The time mean and turbulence properties of a confined swirling jet using the six orientation, single hot wire technique were obtained. The effect of swirl on a confined, expanding jet is to reduce the size of the corner recirculation zone and generate a central recirculation zone followed by a precessing vortex core. The effect of introducing a contraction nozzle of area ratio four, located two test section diameters downstream of the inlet, is to dramatically reduce the size and shape of the central recirculation zone for the swirling flows considered. The shear stresses are found to increase by an order of magnitude in the region of the contraction nozzle because of large radial gradients of axial velocity. Reduction of the expansion ratio to D/o = 1 causes the time mean flow field to be homogeneous throughout the entire test section with the tangential velocity dominating in the swirling cases. No recirculation zones were observed for these particular flows. Turbulence levels and dissipation rates were found to be low except in the entrance regions and in areas of acceleration in the swirling flow cases. Author

N85-26718# Turbomeca S. A. - Brevets Szydlowski, Bordes (France). Dept. Materiaux et Techniques Associees.
NONDESTRUCTIVE TESTS OF CERAMIC COMPONENTS FOR AIRCRAFT TURBINES Final Report [CONTROLE NON DESTRUCTIF DE PIECES EN CERAMIQUE POUR TURBINES AERONAUTIQUES]
A. Dussoulier Oct. 1984 96 p refs In FRENCH
(Contract DRET-83-1080)
Avail: NTIS HC A05/MF A01

Quality control techniques of ceramic pieces used in aircraft turbines are compared and a correlation between manufacturing procedures and detected defects is discussed. Silicon carbide samples presenting typical defects were prepared. The inspection techniques studied included ultrasonics, X-rays, fluorescence, and acoustic scanning microscopy. It is shown that the most traditional methods such as ultrasonic inspection do not have enough resolution while the most advanced techniques are not yet sufficiently developed for use in routine control. Author (ESA)

N85-26719# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction de l'Energetique.
STUDY OF THE PRIMARY ZONE OF GAS TURBINE HEARTHS Final Report [ETUDE DE LA ZONE PRIMAIRE DES FOYERS DE TURBOMACHINES]
Helene Tichtinsky 17 Jul. 1984 29 p refs In FRENCH
(Contract DRET-83-34-134)
(ONERA-RTS-22/3256-EY) Avail: NTIS HC A03/MF A01

The numerical modeling of the primary zone of turbomachinery combustion chambers is studied. The geometrical configuration adopted is simpler than that of an industrial machine but includes three dimensional flow, jet effects, heat exchange, turbulence and combustion. Difficulties in simulating the flow with cold fluids, taking account of fuel injection are found. Nevertheless useful information on the behavior of the unsteady flow is obtained. Author (ESA)

N85-26618# Ishikawajima-Harima Heavy Industries Co. Ltd., Tokyo (Japan).
NUMERICAL ANALYSES IN AERODYNAMIC DESIGN OF AERO-ENGINE FAN
Susumu Nagano *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 55-62 refs In JAPANESE; ENGLISH summary (For primary document see

N85-26611 16-01)
Avail: NTIS HC A10/MF A01

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N85-26720*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PILOTED SIMULATION OF ONE-ON-ONE HELICOPTER AIR COMBAT AT NOE FLIGHT LEVELS
Michael S. Lewis and Edwin W. Aiken Apr. 1985 52 p refs Prepared in cooperation with Army Research and Technology Labs., Moffett Field, Calif.
(NASA-TM-86686; NAS 1.15:86686; USAAVSCOM-TR-85-A-2) Avail: NTIS HC A04/MF A01 CSCL 01C

A piloted simulation designed to examine the effects of terrain proximity and control system design on helicopter performance during one-on-one air combat maneuvering (ACM) is discussed. The NASA Ames vertical motion simulator (VMS) and the computer generated imagery (CGI) systems were modified to allow two aircraft to be independently piloted on a single CGI data base. Engagements were begun with the blue aircraft already in a tail-chase position behind the red, and also with the two aircraft originating from positions unknown to each other. Maneuvering was very aggressive and safety requirements for minimum altitude, separation, and maximum bank angles typical of flight test were not used. Results indicate that the presence of terrain features adds an order of complexiaty to the task performed over clear air ACM and that mix of attitude and rate command-type stability and control augmentation system (SCAS) design may be desirable. The simulation system design, the flight paths flown, and the tactics used were compared favorably by the evaluation pilots to actual flight test experiments. Author

N85-26721*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
DEVELOPMENT AND FLIGHT TEST OF A HELICOPTER, X-BAND, PORTABLE PRECISION LANDING SYSTEM CONCEPT
Thomas J. Davis, George R. Clary, John P. Chisholm (Sierra Nevada Corp., Reno), and Stanley L. Macdonald (Sierra Nevada Corp., Reno) May 1985 13 p refs
(NASA-TM-86710; ; NAS 1.15:86710) Avail: NTIS HC A02/MF A01 CSCL 01C

A beacon landing system (BLS) is being developed and flight tested as a part of NASA's Rotorcraft All-Weather Operations Research Program. The system is based on state-of-of-the-art X-band radar technology and digital processing techniques. The bLS airborne hardware consists of an X-band receiver and a small micropreocessor, installed in conjunction wht the aircraft instrument landing system (ILS) receiver. The microprocessor analyzes the X-band, BLS pulses and outputs ILS-compatible localizer and glide slope signals. Range information is obtained using an on-board weather/mapping radar in conjunction with the BLS. The ground station is an inexpensive, portable unit; it weighs less than 70 lb and can be quickly deployed at a landing site. Results from the flight-test program show that the BLS has a significant potential for providing rotorcaraft with low-cost, precision instrument approach capability in remote areas. Author

N85-26722# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
FLIGHT CONTROL SYSTEM RECONFIGURATION DESIGN USING QUANTITATIVE FEEDBACK THEORY M.S. Thesis
P. B. Arnold Dec. 1984 253 p
(AD-A151771; AFIT/GE/ENG/84D-15) Avail: NTIS HC A12/MF A01 CSCL 01/4

Quantitative theory is used to develop control laws for the AFTI/F-16 with a reconfigurable flight control system. Compensators are synthesized to control pitch rate and roll rate through individually controlled elevators and flaperons. Robust control of these variables is required over a larger portion of the flight envelope despite flight control surface failures. Linearized aerodynamic data are used to develop the aircraft model in state-variable format. The longitudinal and lateral-directional equations are coupled in the control matrix. Individual control of the elevators and flaperons is obtained by dividing the dimensionalized control derivatives for a control surface pair in half and assigning each surface of the pair one-half of the total derivative value. The system with individually controlled surfaces represents a four input-two output system which is transformed into an equivalent two input-two output system for each control surface configuration and flight condition. Quantitative feedback theory is then applied to the equivalent systems. GRA

N85-26723# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
A MODERN CONTROL DESIGN METHODOLOGY WITH APPLICATION TO THE CH-47 HELICOPTER M.S. Thesis
R. D. Holdridge Jan. 1985 249 p
(AD-A151946; AFIT/CI/NR-85-33D) Avail: NTIS HC A11/MF A01 CSCL 01/4

A control system design methodology is developed in this dissertation which produces robust, low-order optimal controllers for multiple-input multiple-output systems. The methodology attempts to focus the strengths of recent Modern Control design algorithms on the problems associated with real control system designs. The methodology is a set of procedures which aids the engineer in creating a realizable controller in either digital or analog form. To demonstrate the usefulness of the methodology, two control augmentation systems (CAS) were designed and flight tested on a CH-47 helicopter at NASA Ames Research Center. The first design was a longitudinal cruise CAS giving the pilot decoupled control of forward velocity and climb rate. This design task demonstrated the low-order controller and robustness features of the methodology. It also demonstrated the use of modern control techniques in designing integral-error controllers. Flight test results are presented. The second controller is a translational velocity command/precision hover hold system. This two mode controller demonstrates the methodology as applied to a more complicated design task which includes control law switching and inner loop/outer loop considerations. Flight test results are also presented. GRA

N85-26724# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE EFFECT OF LOAD FACTOR ON AIRCRAFT HANDLING QUALITIES M.S. Thesis
J. R. Riemer 10 Aug. 1984 374 p
(AD-A152118; AD-E401303; AFIT/GAE/AA/84J-2) Avail: NTIS HC A16/MF A01 CSCL 20/4

This thesis documents the results of a limited simulation and flight test of the A-7D to determine the effect of load factor on aircraft handling qualities. The test condition was 15,000 feet indicated pressure altitude, 0.6 indicated Mach number, at load factors ranging from 1 to 3G's for the mechanical and fully augmented flight control configurations. The equations of motion were developed to include turning flight. GRA

N85-26725# Grumman Aerospace Corp., Bethpage, N.Y.
ESP (EXTERNAL-STORES PROGRAM): A PILOT COMPUTER PROGRAM FOR DETERMINING FLUTTER-CRITICAL EXTERNAL-STORE CONFIGURATIONS. VOLUME 1: USER'S MANUAL
J. B. Smedfjeld Feb. 1985 104 p
(Contracts N00019-81-C-0395; N00019-84-C-0123)
(AD-A152268; AD-E801100; ADCR-85-1-Vol-1) Avail: NTIS HC A06/MF A01 CSCL 09/2

A pilot computer program for determining flutter-critical external-store configurations has been developed and made operational on the Naval Air Development Center Central Computer System. The new program, designated ESP (External-Stores

Program), is a derivative of the previously developed Flutter and Strength Optimization Program (FASTOP). Three key ingredients in ESP are: A p-k flutter-solution algorithm that includes an automated procedure for defining the flutter speed. A calculation of the derivatives of the flutter speed with respect to the store parameters. A gradient-directed numerical-search algorithm to seek out progressively lower flutter speeds within a parameter space defined by the range of store parameters at each aircraft store station. The version of ESP that exists as of this writing was developed primarily with the objective of quickly evaluating the feasibility of the store-search concept. The program structure has not been optimized for minimum computing time, and not all options in the program have been checked. Thus, the current ESP version should be considered as a pilot code. Nevertheless, the unique capabilities of ESP have been shown to provide substantial advantages over previous approaches to the store-flutter problem. Therefore, this user's manual was prepared to permit early utilization of ESP on practical problems. GRA

N85-26726# Grumman Aerospace Corp., Bethpage, N.Y.
ESP (EXTERNAL-STORES PROGRAM): A PILOT COMPUTER PROGRAM FOR DETERMINING FLUTTER-CRITICAL EXTERNAL-STORE CONFIGURATIONS. VOLUME 2: FINAL REPORT ON PROGRAM ENHANCEMENT AND DELIVERY Final Report
J. B. Smedfjeld Feb. 1985 36 p
(Contracts N00019-81-C-0395; N00019-84-C-0123)
(AD-A152269; AD-E801100; ADCR-85-1-Vol-2) Avail: NTIS HC A03/MF A01 CSCL 09/2

A pilot computer program for determining flutter-critical external-store configurations, which was partially developed under two previous Naval Air Systems Command contracts, has been further enhanced and made operational on the Central Computer System at the Naval Air Development Center. The enhancements were introduced to: (1) Increase the applicability of the program to modern attack aircraft with thinner, more flexible wings, and (2) Permit the utilization of aircraft dynamics-model data from both the COSMIC and the MacNeal-Schwendler Corporation versions of NASTRAN, and also from card-image files. Additional modifications, including a substantial reduction in computer core requirements, were made to convert the original IBM code to a CDC version compatible with the computing facility at NADC. Also, logic was added to by-pass data required for store-search runs if only a conventional flutter analysis is desired. Finally, a user's manual was prepared (Volume I of this report), which, in conjunction with a FASTOP user's manual and previous theoretical documentation of the store-search procedure, should permit a practicing flutter analyst to use the new External-Stores Program (ESP) effectively. GRA

N85-26727# Grumman Aerospace Corp., Bethpage, N.Y.
ESP (EXTERNAL-STORES PROGRAM): A PILOT COMPUTER PROGRAM FOR DETERMINING FLUTTER-CRITICAL EXTERNAL-STORE CONFIGURATIONS. VOLUME 3, PART 1: PROGRAM COMPILATION
J. B. Smedfjeld Feb. 1985 693 p
(Contracts N00019-81-C-0395; N00019-84-C-0123)
(AD-A152270; AD-E801100; ADCR-85-1-Vol-3-Pt-1) Avail: NTIS HC A99/MF A02 CSCL 09/2

A pilot computer program for determining flutter-critical external-store configurations has been developed and made operational on the Naval Air Development Center Central Computer System. The new program, designated ESP (External-Stores Program), is a derivative of the previously developed Flutter and Strength Optimization Program (FASTOP). A compilation of the 264 subroutines in ESP is contained herein. The program consists of three major modules: (1) a vibration-analysis module, which begins with subroutine AVAM; (2) a flutter-analysis module, which begins with subroutine AFAM; and (3) a search module (called the flutter-optimization module in FASTOP), which begins with subroutine AFOM. These modules are entered via subroutine FOP, which performs most of the functions of a main program in the FASTOP and ESP Flutter Optimization Package. The actual MAIN program, which calls the FOP subroutine, is designated FASTOP herein. To facilitate locating the compile for a particular routine, two numbered lists of all subroutine names have been provided. The first list, which is in order of appearance in the compile, determines the subroutine numbers. The second list is alphabetical. Part 1 of this volume contains the first 119 subroutines, and Part 2 contains the remainder. GRA

N85-26728# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF THE FOKKER F27 FRIENDSHIP CALCULATED BY SIMPLE HANDBOOK METHODS
J. C. vanderVaart and H. Muhammad Sep. 1983 118 p refs
(VTH-LR-394) Avail: NTIS HC A06/MF A01

The static stability and control characteristics of the F-27 aircraft were calculated using methods in DATCOM and older works of reference. The calculation of location of aerodynamic center, neutral and maneuver points (stick-fixed and stick-free), pitching moment, trim curves and control force curves are all based on the geometric data available in, for instance, the preliminary design stage. Comparison with measured data shows that a reasonable estimate of most of the static stability and control characteristics can be made for this class of aircraft. A more accurate estimate of wing-fuselage pitching moment can be obtained by using a slightly more refined method than the one in DATCOM. Horizontal tail lift due to angle of attack and elevator angle is estimated more accurately using older publications than DATCOM. Author (ESA)

N85-26729# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
APPLICATION OF LINEAR OPTIMAL CONTROL THEORY TO THE DESIGN OF THE ELEVATOR CONTROL SYSTEM OF THE DHC-2 BEAVER EXPERIMENTAL AIRCRAFT
Ouyang Qiu Dec. 1983 104 p refs
(VTH-LR-411) Avail: NTIS HC A06/MF A01

The design of elevator control laws for the electrohydraulic servo control valve of a DHC-2 aircraft based on measurements of actuator position and piston differential pressure such that the elevator follows as closely as possible the electrical command signals is described. State and output feedback optimal control are used. The elevator control system consists of an elevator coupled via two long, flexible cables to a system of bellcranks and rods. This latter system is connected directly to the pilot operated control column. An electrohydraulic servo actuator connected to one of the bellcranks prepares the aircraft for digital control. Author (ESA)

N85-26730# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
TECHNICAL EVALUATION REPORT ON THE FLIGHT MECHANICS SYMPOSIUM ON ACTIVE CONTROL SYSTEMS: REVIEW, EVALUATION AND PROJECTIONS Abstracts Only
Lloyd D. Reid (Toronto Univ.) Loughton, England Mar. 1985 17 p Symp. held in Toronto, 15-18 Oct. 1984
(AGARD-AR-220; ISBN-92-835-1493-9) Avail: NTIS HC A02/MF A01

Research and development in active control systems (ACS) was evaluated. Areas discussed include: handling qualities specifications, use of flight control system backups, development of high integrity systems at reasonable cost, demonstration of system reliability, survivability, and certification. For individual titles, see N85-26731 through N85-26758.

N85-26731# Centre d'Etudes et de Recherches, Toulouse (France).
ACTIVE CONTROL TECHNOLOGY: PAST, PRESENT, FUTURE Abstract Only
M. Pelegrin *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 2 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

A wide range of topics related to active control technology

are reviewed (ACT). It provides the first contact with most of the topics contained in the papers to follow. Areas of discussion include: hardware, software, applications of ACT and reliability considerations. E.A.K.

N85-26732# General Electric Co., Binghamton, N.Y.
THE STATE-OF-THE-ART AND FUTURE OF FLIGHT CONTROL SYSTEMS Abstract Only
R. Quinlivan *In* AGARD Tech Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 2 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

The evolution of active control technology (ACT) from early stability augmentation systems to current full authority flight control systems was covered. The philosophy behind the design of current and future ACS is presented. Both the benefits and the problems involved are highlighted. The potential hazards inherent in reverting to a backup FCS following a total failure of the primary system are discussed. E.A.K.

N85-26733# Systems Technology, Inc., Hawthorne, Calif.
A PERSPECTIVE ON SUPERAUGMENTED FLIGHT CONTROL ADVANTAGES AND PROBLEMS Abstract Only
D. McRuer, D. E. Johnston, and T. T. Myers *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 2 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

A superaugmented FCS both stabilizes an unstble aircraft and provides novel effective vehicle dynamics. The longitudinal dynamics of such an aircraft and FCS are discussed. The total available gain range (TAGR) factor was presented as a basic measure that relates degree of instability, control system limitations, and key control system adjustments. The flying qualities of superaugmented aircraft are discussed and highlighted. E.A.K.

N85-26734# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany).
ASPECTS OF APPLICATION OF ACT SYSTEMS FOR PILOT WORKLOAD ALLEVIATION Abstract Only
K. Wilhelm and B. Gmelin *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 2 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

Aspects of the application of active control technology (ACT) systems for pilot workload alleviation were described for both fixed-wing aircraft and helicopters. The work involved wind tunnel tests of a rotor vibration control system and flight tests of a helicopter control decoupling system. Flight tests in the HFB 320 in-flight simulator were conducted on DLC incorporated within two flight path control techniques. It is found that DLC can only improve flight path control capability without HQ degradation if the pilot is supported by an inner loop augmentation system such as a Rate Command/Attitude Hold (RC/AH) system. Tests carried out in the same aircrft showed the influence of FCS time delays of up to 1.3s in degrading HQ ratings. E.A.K.

N85-26735# General Dynamics Corp., Fort Worth, Tex.
APPLICATION OF AFTI/F-16 TASK-TAILORED CONTROL MODES IN ADVANCED MULTIROLE FIGHTERS Abstract Only
R. D. Toles, D. R. McMonagle (Air Force Flight Test Center, Edwards AFB, Calif.), and D. C. Anderson *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 2-3 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

Flight tests carried out with a highly modified F-16 aircraft to demonsrate the effectiveness of a digital FCS and task-tailored modes are described. The tests specifically dealt with how task-tailoring the longitudinal control laws provide improved HQ for the air-to-air and bombing missions, how a flat turn mode gives the pilot an addedadvantages for the bombing and strafing tasks, and how Level 1 HQ for the landing system are obtained. The key to the flat turn mode is zero sideslip during the maneuver to reduce the aerodynamic load on the stores carried. E.A.K.

N85-26736# Grumman Aerospace Corp., Bethpage, N.Y.
X-29A DIGITAL FLIGHT CONTROL SYSTEM DESIGN Abstract Only
A. B. Whitaker and J. Chin *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 3 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

The structural and control elements going into the design and construction of this unique test aircraft incorporating a forward swept wing are outlined. A number of active control technology (ACT) related concepts were included such as relaxed longitudinal stability, triplex digital FBW system and high gain FCS, a DLC type of response, task-tailoring, drag minimization and an analog backup FCS. E.A.K.

N85-26737# Royal Aircraft Establishment, Farnborough (England).
THE EVALUATION OF ACS FOR HELICOPTERS: CONCEPTUAL SIMULATION STUDIES TO PRELIMINARY DESIGN Abstract Only
J. S. Winter, G. D. Padfield, and S. L. Buckingham *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 3 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

The means by which design aims are defined and how they may be implemented through to the preliminary design stage were investigated. The use of a simplified helicopter model in a ground-based simulator was demonstrated to provide a quick means of studying control problems. A possible control law design for a helicopter is described. A technique for assessing the robustness of a control system design is outlined in the face of unknown or varying elements in the aircrft state matrix. This method, based on the use of maximum singular values, appears to be a useful design tool. E.A.K.

N85-26738# Smiths Industries Ltd., London (England).
ACT APPLIED TO HELICOPTER FLIGHT CONTROL Abstract Only
W. R. Richards *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 3 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

The ACS configurations suitable for installation in the 1988 and 1992 time scales were identified. Reliability aspects, control law philosophy and the impact of advanced technology are discussed. It appears that fibre optics and the replacement of electrical devices by optical ones where possible will be required to meet the challenge of EMP/EMC and lightning strikes. E.A.K.

N85-26739# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
SOME FLIGHT TEST RESULTS WITH REDUNDANT DIGITAL FLIGHT CONTROL SYSTEMS Abstract Only
U. Korte *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 3 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

The successful flight test program carried out in a modified F-104G was outlined. A digital quadruplex FBW and FCS was used to stabilize the airframe which was destabilized longitudinally by the addition of aft located ballast and a canard surface. Flights were completed in which the successful operation of the FCS was demonstrated along with reversion to a simplified digital backup system. It is indicated that FCS software verification is not as great a problem as many think and that reversion to a properly implemented backup FCS can be handled by pilots in an operational environment. E.A.K.

N85-26740# British Aerospace Aircraft Group, Preston (England).
AN UPDATE ON EXPERIENCE ON THE FLY BY WIRE JAGUAR

EQUIPPED WITH A FULL-TIME DIGITAL FLIGHT CONTROL SYSTEM Abstract Only
E. Daley *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 3 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

A technology demonstration program was presented which emphasized relaxed stability, carefree maneuvering and protection against EM interference in the form of lightning and high frequency radio signals. The quadruplex fly by wire (FBW) system had no mechanical backup. The FCS was demonstrated during close to 100 flights and the EM immunity of the complete system was proven during extensive ground tests. It is concluded that, both customer and aircraft manufacturer are confident that active control systems can be implemented safely and cheaply with similar integrity to present day mechanical systems, and that the aircrft can be acceptably hardened against natural and man-made EM interference'. E.A.K.

N85-26741# British Aerospace Public Ltd. Co., Brough (England).
ACT FLIGHT RESEARCH EXPERIENCE Abstract Only
D. J. Walker and R. M. Horner (RAE) *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 3 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

The Hunter ACT aircraft development and flight test program was reviewed. A number of practical hardware aspects of the project were discussed. The FCS in-flight tests included a nonlinear pitch filter (with an effect much like the pitch axis task tailoring) and a depressed roll axis (about the sight axis). Mixed success in using ground based simulators during system development was reported. E.A.K.

N85-26742# McDonnell Aircraft Co., St. Louis, Mo.
OPERATIONAL AND DEVELOPMENTAL EXPERIENCE WITH THE F/A-18A DIGITAL FLIGHT CONTROL SYSTEM Abstract Only
W. A. Moran *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 3-4 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

An operational aircraft making full use of ACT is described. Of particular interest was the use of the digital FCS to help solve several developmental problems encountered during the flight testing of the F/A-18A. Four problems were highlighted: poor nosewheel liftoff characteristics; insufficient roll performance; excessive structural loads; unwanted roll coupling. All these difficulties were overcome in a unique and cost effective manner with the help of the digital FCS. The system designers managed to reduce an unacceptably large FCS time delay to a reasonable value of 70 ms. E.A.K.

N85-26743# Naval Air Test Center, Patuxent River, Md.
FLIGHT TESTING AND DEVELOPMENT OF THE F/A-18A DIGITAL FLIGHT CONTROL SYSTEM Abstract Only
R. A. Burton, B. T. Kneeland, U. H. Rabin (Systems Control Technology, Inc.), and R. S. Hansen (Systems Control Technology, Inc.) *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 4 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

A new technique was presented for extracting equivalent system models, which uses several algorithms including a maximum likelihood estimator method. This and the use of closed loop pilot mission related task testing was successfully employed to evaluate the FCS during its development. The use of the equivalent model is recommended for ground based simulation during the design phase. E.A.K.

N85-26744# Dornier-Werke G.m.b.H., Munich (West Germany).
OLGA: AN OPEN LOOP GUST ALLEVIATION Abstract Only
H. Bohret, B. Krag (DFVLR, Brunswick, West Germany), and J. Skudridakis (DFVLR, Brunswick, West Germany) *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 4 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

Following sophisticated wind tunnel trials, a flight test program was carried out using a Do 28 TNT aircraft to evaluate the effectiveness of an open loop gust alleviation system. By using an open loop approach the basic airframe dynamics were left unaltered. Ecitation of the wing's first bending mode by the system was removed by employing a suitably tuned notch filter. It is found that the suppression of low frequency accelerations by the OLGA system made the passengers more conscious of other sources of discomfort. E.A.K.

N85-26745# Lockheed-California Co., Burbank.
DEMONSTRATION OF RELAXED STABILITY ON A COMMERCIAL TRANSPORT Abstract Only
J. J. Rising, W. J. Davis, and C. S. Willey *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 4 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

The application of relaxed stability to current transport aircraft can lead to a 2% drag reduction. This can rise to 4% for next generation aircraft. A flight test program and a ground based flight simulator program employing an L-1011 aircraft have demonstrated the successful implementation of this concept. Stability augmentation was provided by a digital FCS and HQ ratings were obtained for a range of conditions. It was concluded that, careful tailoring of the augmentation system authority will result in acceptable failure characteristics, thereby eliminating the need for multisystem redundancy. Author

N85-26746# Messerschmitt-Boelkow-Blohm G.m.b.H., Hamburg (West Germany).
REALISATION OF RELAXED STATIC STABILITY ON A COMMERCIAL TRANSPORT Abstract Only
U. P. Graeber *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 4 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

This paper deals with the use of fuel transfer to an aft located tank in order to reduce the trim drag on a commercial transport. Both ground based simulator trials and flight tests in an Airbus A300 were employed to demonstrate the aircraft could be flown both manually and by the autopilot with significantly aft o.g. locations. it is suggested that the use of such fuel transfer techniques is the only practical way to achieve reduced stability in an operational commercial transport. Author

N85-26747*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
ACTIVE CONTROL TECHNOLOGY EXPERIENCE WITH THE SPACE SHUTTLE IN THE LANDING REGIME Abstract Only
B. G. Powers *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 4 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01 CSCL 01C

An interesting description was provided of the development of the shuttle flight control systems. Of particular concern was a tendency to excite PIO during the landing phase. Both ground based and in-flight simulation were used to study the problem. It was found that in-flight simulation was the only reliable method to use in the study of PIO. Two of the major contributions to the PIO problem were found to be system time delay and the lack of a clear motion cue at the pilot's location following a pitch up command. The PIO problem was solved by reducing the demands of the piloting task and introducing an adaptive stick gain limiter. Author

N85-26748# London Univ. (England).
THE AERODYNAMICS OF CONTROLS Abstract Only
A. D. Young *In* AGARD Tech. Evaluation Rept. on the Flight

Mech. Symp. on Active Control Systems Mar. 1985 p 4 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

A comprehensive review is gien of the various conventional and unconventional control surfaces (or motivators) available for use as part of an active control system. A better understanding of the aerodynamics of such motivators is needed in order to make effective use of them. In particular, dynamic effects and the influence of flight at high angles of attack and at transonic speeds on these devices needs further study. A better data base must be generated to aid the designer. B.W.

N85-26749*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ACTIVE CONTROL LANDING GEAR FOR GROUND LOADS ALLEVIATION Abstract Only
J. R. McGehee *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 4-5 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01 CSCL 01C

An active landing gear has been created by connecting the hydraulic piston in an oleo strut to a hydraulic supply. A controller modulates the pressure in the oleo to achieve the desired dynamic characteristics. Tests on ground rigs (documented by a film) have demonstrated the successful alleviation of induced structural ground loads and the next step will be a flight test using a fighter aircraft. Author

N85-26750# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
WING BUFFETING ACTIVE CONTROL TESTING ON A TRANSPORT AIRCRAFT CONFIGURATION IN A LARGE SONIC TUNNEL Abstract Only
R. Destuynder *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 5 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

A sophisticated large aerelastic half model has been developed to duplicate the structural characteristics of a typical civil transport aircraft. An active flaperon system has been developed to dampen out structural response to buffeting experienced at high angles of attack and/or Mach numbers of the range 0.50-0.82. This was achieved without increasing the structural modal frequencies. The resulting reduced structural strain and airframe motion effectively increase the usable flight envelope. Author

N85-26751# British Aerospace Aircraft Group, Brough (England).
A MODULAR DISSIMILAR REDUNDANT COMPUTER DESIGNED FOR HIGH INTEGRITY CONTROL Abstract Only
S. M. Wright and R. G. Burrage (Lucas Aerospace Ltd., Birmingham, England) *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 5 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

In order to apply modern digital hardware in a full authority high integrity control system, suitable precautions must be taken to avoid the consequences of a common mode data dependent error in a multi-lane system. A pseudo code based dissimilar modular multiprocessor design was described as a possible routine way of applying dissimilar techniques and hardwre at minimum cost. A safety map approach was developed to aid the designer in selection the system architecture. Author

N85-26752# National Aero- and Astronautical Research Inst., Amsterdam (Netherlands).
HOW TO HANDLE FAILURES IN ADVANCED FLIGHT CONTROL SYSTEMS OF FUTURE TRANSPORT AIRCRAFT Abstract Only
M. P. C. vanGool *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 5 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

A ground-based simulator program in which reversion to an unstable flight control system backup occurred following the failure of the primary system. Of interest was the large scatter in the HQ ratings given to the backup system. It was found that existing longitudinal HQ criteria have difficulty in explaining the trend in pilot aircraft will be a very complicated task. B.W.

N85-26753# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
INTERACTIVE DESIGN OF SPECIFICATIONS FOR AIRBORNE SOFTWARE SET (GISELE) Abstract Only c61
J. Choplin and D. Beurrier *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 5 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

An flight control system software development process/system is described that possesses the features needed to generate production level certifiable software. It was designed to assist the user at all stages of development and testing and to generate the required level of documentation. Giesele has been in use since 1983. B.W.

N85-26754# Societe Nationale Industrielle Aerospatiale, Paris (France).
THE CERTIFICATION OF AIRBORNE COMPLEX DIGITAL SYSTEMS Abstract Only
P. Toulouse *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 5 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

An overview is presented of how the certification process might be applied to future active control based aircraft. Present regulations (FAR/JAR 25) are not very specific as to how compliance with safety consideration might be carried out. Presently more specific regulations (e.g., AC/ACJ 1309 and RTCA DO 178/ EUROCAE ED. 12) are being developed in which step by step procedures are proposed. Demonstration of compliance will require a combination of risk analysis, software analysis and ground test reports. It is suggested that all software maintenance should be under the control of the original designer. B.W.

N85-26755# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
THE FLIGHT CONTROL SYSTEM FOR THE EXPERIMENTAL AIRCRAFT PROGRAMME (EAP) DEMONSTRATOR AIRCRAFT Abstract Only
J. Kaul, F. Sella (Aeritalia S.p.A), and M. J. Walker (British Aerospace Aircraft Group) *In* AGARD Tech. Evaluation Rept. on the Flight Mech Symp. on Active Control Systems Mar. 1985 p 5 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

The historial background of the Experimental Aircraft Program is (EAP) presented. Because the first flight is planned for May 1986 the FCS design is based on previously proven technology. The aircraft is intended to demonstrate: (1) advanced structures and materials; (2) advanced aerodynamics ; (3) active control; (4) digital data bus; (5) modern cockpit; (6) stealthiness; and (7) digital control of the engine. B.W.

N85-26756# Boeing Aerospace Co., Seattle, Wash.
AUTOMATIC FLIGHT CONTROL MODES FOR THE AFTI/F-111 MISSION ADAPTIVE WING AIRCRAFT Abstract Only
M. R. Evans, R. J. Hynes, D. C. Norman, and R. E. Thomasson *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 5 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

This program involves the fitting of an experimental F-111 with a variable-camber wing and a digital FCS that makes use of this feature. The following automatic modes have been implemented: (1) Maneuver camber control to maximize lift/drg; (2) Cruise camber control - to maximize horizontal velocity; (3) Maneuver load control - to reduce wing root bending; and (4) Maneuver enhancement and gust alleviation - uses variable camber and the

horizontal tail to increase maneuver response and to reduce gust response. B.W.

N85-26757# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
THE STOL AND MANEUVER TECHNOLOGY PROGRAM INTEGRATED CONTROL SYSTEM Abstract Only
D. J. Moorhouse and D. R. Selegan *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 6 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

The application of STOL capability to a supersonic fighter is discussed. This will be accomplished by employing a level of control integration beyond any attempted so far. In particular to a highly modified propulsion system will be incorporated as a primary control element. The control system design will require an integrated team of aerodynamics, stability and control, flying qualities, guidance, display, propulsion and controls specialists. The test aircraft will be an F-15 and the project will extend over the next 4-5 years. B.W.

N85-26758# Westland Helicopters Ltd., Yeovil (England).
THE EVOLUTION OF ACTIVE CONTROL TECHNOLOGY SYSTEMS FOR THE 1990'S HELICOPTER Abstract Only
G. C. F. Wyatt *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 6 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

A reviewed is presented of the application of active control systems in helicopters. System failures and how best to deal with them are discussed. The author emphasized the need for: (1) Considering civil active control technology applications when undertaking military R and D; (2) More study of the common mode failure problem; and (3) Increased flight testing of ACT aircraft. B.W.

N85-26630# National Aerospace Lab., Tokyo (Japan).
NUMERICAL SIMULATION OF TRANSONIC FLUTTER OF A HIGH-ASPECT RATIO TRANSPORT WING
Koji Isogai *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 187-198 refs In JAPANESE (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26639# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Aircraft Div.
SOME ASPECTS OF HOW TO DESIGN COST-EFFECTIVE FLIGHT CONTROL SYSTEMS
U. Butter and L. Botzler *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 14 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26653# British Aerospace Public Ltd. Co., Preston (England).
A METHOD OF ESTIMATING AIRCRAFT ATTITUDE FROM FLY BY WIRE FLIGHT CONTROL SYSTEM DATA
Reginald J. V. Snell *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 9 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-27729 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Aircraft Div.
SOME ASPECTS OF HOW TO DESIGN COST-EFFECTIVE FLIGHT CONTROL SYSTEMS
U. Butter and L. Botzler *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 71-84 Presented at 39th AGARD-GCP Panel Meeting/Symp. on Cost-Effective and Affordable Guidance and Control System, Cesme, Turkey, 15-19 Oct. 1984 (For primary document see N85-27724 16-81)
(MBB-LKE-32/S/PUB/143) Avail: Issuing Activity

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N85-26759*# Sverdrup Technology, Inc., Arnold Air Force Station, Tenn.
STUDY ON NEEDS FOR A MAGNETIC SUSPENSION SYSTEM OPERATING WITH A TRANSONIC WIND TUNNEL Final Report
W. R. Martindale, R. W. Butler, and R. F. Starr Washington NASA May 1985 107 p refs
(Contract NAS1-17423)
(NASA-CR-3900; NAS 1.26:3900) Avail: NTIS HC A06/MF A01 CSCL 14B

The U.S. aeronautical industry was surveyed to determine if current and future transonic testing requirements are sufficient to justify continued development work on magnetic suspension and balance systems (MSBS) by NASA. The effort involved preparation of a brief technical description of magnetic suspension and balance systems, design of a survey form asking specific questions about the role of the MSBS in satisfying future testing requirements, selecting nine major aeronautics companies to which the description and survey forms were sent, and visiting the companies and discussing the survey to obtain greater insight to their response to the survey. Evaluation and documentation of the survey responses and recommendations which evolved from the study are presented. Author

N85-26760*# Douglas Aircraft Co., Inc., Long Beach, Calif.
PROBABILISTIC COMPUTER MODEL OF OPTIMAL RUNWAY TURNOFFS Final Report
M. L. Schoen, O. W. Preston, L. G. Summers, B. A. Nelson, L. VanderLinden, and M. C. McReynolds Apr. 1985 62 p refs
(Contract NAS1-16202)
(NASA-CR-172549; NAS 1.26:172549) Avail: NTIS HC A04/MF A01 CSCL 01E

Landing delays are currently a problem at major air carrier airports and many forecasters agree that airport congestion will get worse by the end of the century. It is anticipated that some types of delays can be reduced by an efficient optimal runway exist system allowing increased approach volumes necessary at congested airports. A computerized Probabilistic Runway Turnoff Model which locates exits and defines path geometry for a selected maximum occupancy time appropriate for each TERPS aircraft category is defined. The model includes an algorithm for lateral ride comfort limits. Author

N85-26761# Clemson Univ., S.C. Dept. of Civil Engineering.
STUDY OF ACCEPTANCE CRITERIA FOR JOINT DENSITIES IN BITUMINOUS AIRPORT PAVEMENTS Final Report
J. L. Burati and G. B. Elzoghbi Feb. 1985 110 p refs
(Contract DTFA-01-81-C-10057)
(FAA-PM-85-5) Avail: NTIS HC A06/MF A01

A research project to: (1) collect data on field projects to determine joint density values currently obtained in the field on bituminous runway paving projets, (2) determine whether correlation exists between mat density and joint density results, (3) determine whether correlation exists between the results for nuclear density gages and the core densities obtained in the field and (4) determine whether to use nuclear density gages in the acceptance plan for bituminous runway pavements is summarized. Data were collected on 2 runway paving projects selected by the FAA Eastern Region during the spring of 1984 using 3 nuclear density gages (CPN M-2, Seaman C-75BP and Troxler 3411-B). These data were analyzed statistically to identify current production capabilities and possible correlations between mat and joint density results and between nuclear gage readings and core results. The findings

indicate that joint density values are statistically significantly lower and more variable than density values attained in the paving mat. Statistically significant differences were also found in the nuclear gage results. The nuclear gage results were also significantly lower than corresponding core densities. Regression analyses indicated that the level of correlation among the core and gage results varied from gage to gage and from project to project. Author

N85-26762# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN AND SPECIFICATION OF A LOCAL AREA NETWORK ARCHITECTURE FOR USE IN REAL-TIME FLIGHT SIMULATION M.S. Thesis
L. R. Maki Sep. 1984 209 p
(AD-A152242; AFIT/GCS/ENG/84S-3) Avail: NTIS HC A10/MF A01 CSCL 09/5

This investigation examined the use of a Local Area Network (LAN) in the real-time environment of the Air Force Flight Dynamics Laboratory's Flight Control Development Laboratory (FCDL) flight simulation facility. Using the requirements of the FCDL's Manned Combat Station (MCS) project as a guideline, a LAN based on the Ethernet protocol specification was identified as suitable for use in the real-time flight simulation facility. Both the architecture and the performance of the Ethernet protocol were examined to make this conclusion. The selection of the Intel 82586 Local Communications Controller chip (which defaults to the Ethernet specification), the in-house design and manufacture of a Network Interface Board (NIB) using this chip, and the standard operating procedure for FCDL simulations allowed a software design to be completed for the control of the NIB. A recommended course of action for the FCDL is made for the eventual implementation of the proposed LAN and software design. GRA

N85-26763# New Mexico State Univ., Las Cruces. Solar Energy Inst.
EXPERIMENTAL TESTING OF COOLING BY LOW PRESSURE ADSORPTION IN A ZEOLITE
C. M. Redman Jan. 1985 202 p refs Prepared for Pacific Northwest Lab., Richland, Wash.
(Contract DE-AC06-76RL-01830)
(DE85-007509; PNL-5365) Avail: NTIS HC A10/MF A01

A small scale facility was designed, constructed, and utilized to test the use of zeolite adsorption of water vapor to augment chill storage in ice for conventional space cooling. The facility uses solar derived energy, for the heat source and evaporatively chilled water for the heat pump. The product cooling uses sublimation of ice instead of melting. The ZCAT facility utilizes a heat pumping technique in which a water vapor adsorbent functions as the compressor and condenser. The design was based on use of 13X zeolite as the adsorber because of its high adsorbence at low pressures. It was determined that other materials such as silica gel should give superior performance. While zeolite 13X holds more water in the pressure and temperature ranges of interest, silica gel cycles more water and has less residue water. Both points are very important in the design of an efficient and cost effective system. DOE

N85-26764# Pacific Northwest Lab., Richland, Wash.
RADIOLUMINESCENT LIGHTING FOR RURAL ALASKAN RUNWAY LIGHTING AND MARKING
G. A. Jensen and L. E. Leonard (Dept. of Transportation and Public Facilities, Fairbanks, Alaska) Nov. 1984 31 p refs Presented at the Ann. Meeting of the Illum. Eng. Soc. of North Am., Charleston, S.C., 14 Nov. 1984
(Contract DE-AC06-76RL-01830)
(DE85-007022; PNL-SA-12723; CONF-8411127-2) Avail: NTIS HC A03/MF A01

Various applications of tritium radioluminescent (RL) lighting are discussed for use in the State of Alaska with emphasis on airport lighting and landing aids. Estimates are made that attempt to quantify potential use of RL systems by the State of Alaska and others. Critical factors that are expected to influence the implementation of RL lighting systems are identified: regulatory agencies approvals, cost of tritium and tritium products, and public and institutional acceptance of RL systems. A summary of results of demonstrations, tests, and evaluations related to Alaskan and Arctic use of the lights is also included. DOE

N85-26765# Pacific Northwest Lab., Richland, Wash.
ACCEPTABILITY TESTING OF RADIOLUMINESCENT LIGHTS FOR VFR-NIGHT AIR TAXI OPERATIONS
G. A. Jensen Jan. 1985 34 p refs
(Contract DE-AC06-76RL-01830)
(DE85-007303; PNL-5347) Avail: NTIS HC A03/MF A01

Tritium-powered radioluminescent (RL) lights under development for remote, austere, and tactical airfield lighting applications are discussed. The State of Alaska has requested FAA approval for use of the technology as a safe alternative lighting system to meet the airfield lighting needs of air taxi operations and general aviation in the state. The tests described in this report were performed for the DOE Defense Byproducts Production and Utilization Program. These tests are a step toward gaining the required approvals. DOE

N85-26766# Shute (Arthur C.), East Sebago, Maine.
WATER BRAKE CONVERTOR: A SIMPLE DEVICE TO CONVERT MECHANICAL ENERGY INTO HEAT ENERGY Final Report
Arthur C. Shute 29 Apr. 1984 37 p
(Contract DE-FG41-80R1-10354)
(DE85-006021; DOE/R1-10354/T1) Avail: NTIS HC A03/MF A01

The design, operation, and performance of a prototype water brake converter are described. Drawings of the prototype and test stand are included. Test results are detailed. (WHK) DOE

N85-27731 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
ADVANCED FLIGHT SIMULATION FOR HELICOPTER DEVELOPMENT
H. Huber, H.-J. Dahl, and A. Inglsperger *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 173-188 refs Presented at AGARD/GCP 38th Panel Meeting Symp. on Helicopter Guidance and Control Systems for Battlefield Support, Monterey, Calif., 7-11 May 1984 Previously announced as N85-16815 Sponsored by West Germany Ministry of Defence (For primary document see N85-27724 16-81)
(MBB-UD-416/84-O) Avail: Issuing Activity

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N85-26767*# National Aeronautics and Space Administration, Washington, D. C.
MICROGRAVITY: A NEW TOOL FOR BASIC AND APPLIED RESEARCH IN SPACE
1985 31 p Original contain color photographs
(EP-212) Avail: S.O.D. CSCL 22A

Selected aspects of the NASA Microgravity Science and Applications program are highlighted. So that the understanding and control of physical processes can be expanded basic and applied research in electronic materials, metals, glasses and ceramics, biological materials, combustion and fluids and chemicals are supported. NASA facilities that provide weightless environments on the ground, in the air, and in space are available to U.S. and foreign investigators representing the academic and industrial communities. After a rief history of microgravity research, the advantages and methods of performing microgravity research are explained. Illustrations follow of equipment used and experiments performed aboard the Shuttle and of prospects for future research. The program goals and the opportunities for participation are explained. Author

N85-26768*# Purdue Univ., Lafayette, Ind.
STUDIES ON THE PROCESSING METHODS FOR EXTRATERRESTRIAL MATERIALS Final Report
Robert T. Grimley and Michael E. Lipschutz 8 May 1984 5 p Sponsored by NASA Prepared for JPL, Pasadena, Calif.
(Contract JPL-956322)
(NASA-CR-175778; JPL-9950-1065; NAS 1.26:175778) Avail: NTIS HC A02/MF A01 CSCL 22A

The literature was surveyed for high temperature mass spectrometric research on single oxides, complex oxides, and minerals in an effort to develop a means of separating elements and compounds from lunar and other extraterrestrial materials. A data acquisition system for determining vaporization rates as a function of time and temperature and software for the IEEE-488 Apple-ORTEC interface are discussed. Experimental design information from a 1000 C furnace were used with heat transfer calculations to develop the basic design for a 1600 C furnace. A controller was built for the higher temperature furnace and drawings are being made for the furnace. A.R.H.

N85-26769*# Computer Sciences Corp., Silver Spring, Md.
FLIGHT EXPERIMENT DEMONSTRATION SYSTEM (FEDS) FUNCTIONAL DESCRIPTION AND INTERFACE DOCUMENT
R. C. Belcher and Dwight E. Shank Dec. 1984 273 p refs
(Contract NAS5-27888)
(NASA-CR-175290; NAS 1.26:175290; CSC/SD-84-6055) Avail: NTIS HC A12/MF A01 CSCL 22A

This document presents a functional description of the Flight Experiment Demonstration System (FEDS) and of interfaces between FEDS and external hardware and software. FEDS is a modification of the Automated Orbit Determination System (AODS). FEDS has been developed to support a ground demonstration of microprocessor-based onboard orbit determination. This document provides an overview of the structure and logic of FEDS and details the various operational procedures to build and execute FEDS. It also documents a microprocessor interface between FEDS and a TDRSS user transponder and describes a software simulator of the interface used in the development and system testing of FEDS. B.W.

N85-26770# Los Alamos Scientific Lab., N. Mex.
IN-SITU ROCK MELTING APPLIED TO LUNAR BASE CONSTRUCTION AND FOR EXPLORATION DRILLING AND CORING ON THE MOON
John C. Rowley and Joseph W. Neudecker 1984 29 p refs Presented at the Lunar Bases and Space Activities of the 21st Century Conf., Washington, D.C., Oct. 1984
(Contract W-7405-eng-36)
(DE85-006716; LA-UR-85-384; CONF-8410230-7) Avail: NTIS HC A03/MF A01

An excavation technology based upon melting of rock and soil has been extensively developed at the prototype hardware and conceptual design levels for terrestrial conditions. Laboratory and field tests of rock-melting penetration have conclusively indicated that this excavation method is insensitive to rock, soil types, and conditions. Especially significant is the ability to form in-place glass linings or casings on the walls of boreholes, tunnels, and shafts. These factors indicate the unique potential for in situ construction of primary lunar base facilities. Drilling and coring equipment for resource exploration on the moon can also be devised that are largely automated and remotely operated. It is also very likely that lunar melt-glasses will have changed mechanical properties when formed in anhydrous and hard vacuum conditions. Rock melting experiments and prototype hardware designs for lunar rock-melting excavation applications are suggested. DOE

N85-26771# European Space Agency, Paris (France).
EUROPEAN SPACE SCIENCE HORIZON 2000
Norman Longdon, ed. 1984 143 p Original contains color illustrations
(ESA-SP-1070; ISSN-0039-6566) Avail: NTIS HC A07/MF A01

The ESA solar system science and space astronomy programs are outlined. Mission trends and industrial benefits are considered. Areas covered include solar and heliospheric physics, space plasma physics and planetary research. Author (ESA)

N85-26772# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE
6 May 1985 122 p Transl. into ENGLISH from various Russian articles
(JPRS-USP-85-004) Avail: NTIS HC A06

News items, abstracts and scientific reports on aspects of space including manned mission highlights; space sciences; space applications; life sciences; space engineering; and space policies. For individual titles, see N85-26773 through N85-26832.

N85-26773# Joint Publications Research Service, Arlington, Va.
TASS REPORTS PROGRAM FOR SALYUT-7 FULLY COMPLETED Abstract only
In its USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 1 Transl. into ENGLISH from Pravda (Moscow), 2 Mar. 1985 p 2 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The Salyut-7 scientific station was functioning in near-Earth orbit for more than 34 months. During this time three main expeditions have worked on the station for periods of 211, 150 and 237 days. In addition, there were four visiting expeditions, including two international ones with cosmonauts from France and India. For the first time a female cosmonaut, S. Ye. Savitskaya, performed work in open space. A number of complex repair and maintenance operations were performed both inside the Salyut-7 station and in open space. A significant amount of research and experientation was carried out in the interest of science and the national economy. The data obtained are being processed by institutes of the USSR Academy of Sciences. In view of the fact that the planned program of work on the Salyut-7 station was fulfilled completely, the station was deactivated and is continuing its flight in automatic mode. Author

N85-26774# Joint Publications Research Service, Arlington, Va.
COSMONAUT SAVITSKAYA SAYS MANY WOMEN IN COSMONAUT TRAINING Abstract Only
V. Fartyshev and Svetland Yevgenyevna Savitskaya *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 2 Transl. into ENGLISH from Kosmolskaya Pravda (Vilnius, USSR), 22 Jan. 1985 p. 1 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Cosmonaut Svetlana Yevgen'yevba Savitskaya was interviewed in connection with the upcoming 12th World Festival of Young People and students in Moscow. Savitskaya is a member of the soviet preparatory committee for this festival. Savitskaya comments on welding and biotechnology experiments in which she took part during her second mission on board the orbiting station Salyut-7 and responds to another question about the goals of U.S. and Soviet space research. Savitskaya discussed future space flights by women. B.G.

N85-26775# Joint Publications Research Service, Arlington, Va.
ACADEMICIAN ZUYEV NOTES PLANS FOR LASERS ON SPACECRAFT FOR ATMOSPHERIC RESEARCH Abstract Only **c36**
V. Dolmatov and Vladimir Yevseyevich Zuyev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 3-4 Transl. into ENGLISH from Sov. Rossiya (Moscow), 29 Jan. 1985 p 1 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Atmospheric optics and the creation of laser complexes were discussed. Weather forecasting, atmospheric pollution, and oceanography are areas of interest to be studied by remote sensing. Plans for future research are mentioned. B.G.

N85-26776# Joint Publications Research Service, Arlington, Va.
SATELLITE RESEARCH ON SOLAR FLARES Abstract Only **c92**
Zh. Manilova and Grant Yegorovich Kocharov *In its* USSR Rept.:

Space (JPRS-USP-85-004) 6 May 1985 p 5 Transl. into ENGLISH from Leningradskaya Pravda (Leningrad), 27 Jan. 1985 p 4 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Spaceborne experiments were designed to study the origin and nature of solar flares. The mechanism by which the energy of the Sun's magnetic fields is converted into the energy of accelerated elementary particles are studied. It was found that light electrons, heavy protons and nuclei of a number of heavy elements are accelerated not in succession, as was formerly thought, but simultaneously. In the space of a second or fractions of a second, these particles are accelerated over tremendous distances and acquire energies as high as tens of millions of electron volts. Solar neutrons which provided extremely fine primary information on energy characteristics of the solar acceleration mechanism were registered for the first time in history with the aid of satellite and ground instruments. These neutrons were found to have energies as high as one billion electron volts. Results are expected to find practical use in the improvement of measures for protecting cosmonauts against radiation hazard. B.G.

N85-26777# Joint Publications Research Service, Arlington, Va.
POSITIONS OF RELATIVE EQUILIBRIUM OF SATELLITE-GYROSTAT Abstract Only **c13**
V. A. Sarychev and S. A. Gutnik *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 6 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 323-326 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The motion of a satellite in a central Newtonian force field was investigated. It is assumed that within the satellite there are statically and dynamically balanced flywheels rotating at a constant angular velocity relative to the body of the satellite. The equations of motion for a satellite gyrostat whose center of mass moves in a circular orbit are given. In a general case there are no more than 24 positions of equilibrium in the orbital coordinate system. An equation is derived which can be used in evaluating their stability. B.G.

N85-26778# Joint Publications Research Service, Arlington, Va.
INTEGRABLE CASES OF RESTRICTED DOUBLY AVERAGED 3-BODY PROBLEM Abstract Only **c64**
M. A. Vashkovyak *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 7 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 327-334 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The doubly averaged variant of the restricted elliptical problem of three bodies is described by averaged equations in osculating elements with the perturbing function W. A force function of an elliptical Gaussian ring is used in describing the influence of a perturbing point of the mass which moves relative to a central body S of the mass in an elliptical orbit with the semimajor axis and the eccentricity. With certain additional assumptions, a system of Lagrangian equations with two integrals is derived. However, these integrals are inadequate for integrating the system of averaged equations in quadratures. There are some cases when the problem becomes integrable and an analysis makes it possible to clarify the qualitative characteristics of orbital evolution of the point P n orbit and to compute the main quantitative characteristics. Stationary solutions of the averaged problem are of particular interest because they determine the simplest elliptical orbits, whose mean elements remain constant in the considered approximation. Integrable cases of the averaged problem involve additional simplifying assumptions and are usually governed by symmetry of one type or another. Author

N85-26779# Joint Publications Research Service, Arlington, Va.
THE 6 PI-PERIODIC SOLUTIONS OF PLANE RESTRICTED ELLIPTICAL 3-BODY PROBLEM IN NEIGHBORHOOD OF LIBRATION POINTS Abstract Only **c64**
A. Ikrotov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 7-8 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun 1984 p 335-340 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

A system of equations of motion of the plane restricted elliptical problem of three bodies is examined. The existence of 6 pi-periodic solutions in the neighborhood of the libration points and their approximate construction are examined. It is shown that with a constant value of the ratio of masses mu there is a neighborhood of the triangular libration point at which six families of 6 pi-periodic solutions are allowed. The latter are constructed by the method of indeterminate coefficients in the form of series in powers of eccentricity, where the coefficients are determined from the successive approximations equation. Recurrent formulas are derived for constructing the periodic solutions. B.G.

N85-26780# Joint Publications Research Service, Arlington, Va.
STABILITY OF PERIODIC SATELLITE MOTIONS RELATIVE TO CENTER OF MASS IN CIRCULAR ORBIT Abstract Only **c13**
A. A. Saitbattalov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 8-9 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun 1984 p 341-351 Original language doc. was announced in IAA as A84-39504 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Sufficient conditions of the orbital stability of periodic Poincare solutions for the majority of initial values are obtained for a class of autonomous Hamiltonian systems with three degrees of freedom in the case of intrinsic dgeneracy. The results obtained are used to study the stability of the periodic motions of a three axis satellite with a quasi-spherical ellipsiod of inertia in circular orbit. B.J. (IAA)

N85-26781# Joint Publications Research Service, Arlington, Va.
OPTIMUM ROTATION OF SOLID BODY WITH 1 AXIS OF SYMMETRY Abstract Only **c70**
V. N. Branets, M. B. Chertok, and Yu. V. Kaznacheyev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 9-10 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 352-360 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The problem of control of motion of a solid body about its center of mass is examined, and the equations of motion are given. The formalism of quaternions is used in describing the motion. Pertinent kinematic equations are indicated and boundary conditions are set for the positions of the solid body and its angular velocity. The Pontryagin maximum principle is used. The problem can be reduced to solution of a closed system of nine differential equations. Equations are derived for minimizing rotation and a functional having the sense of expenditure of the working medium. A.R.H.

N85-26782# Joint Publications Research Service, Arlington, Va.
OPTIMUM PARAMETERS OF AEROGYROSCOPIC SATELLITE ORIENTATION SYSTEM Abstract Only **c19**
V. A. Sarychev, S. A. Mirer, and V. A. Zlatoustov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 10-11 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 369-380 Original language doc. was announced in IAA as A84-39507 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The dynamics of a satellite with an aerodynamic stabilizer and two gyros with parallel precession axes is analyzed, and equilibrium configurations of the system in circular orbit are obtained. The parameters for which the natural oscillations of the satellite are damped with maximum rapidity are determined, and separate consideration is given to a satellite with fixed moments of inertia, an axisymmetric satellite, and a satellite with arbitrary moments of inertia. Oscillations in the plane of the circular orbit are studied analytically, and the effect of the aerodynamic stabilizer on the amplitude of eccentric oscillations is evaluated. B.J.

N85-26783# Joint Publications Research Service, Arlington, Va.
METHOD FOR EVALUATING PERTURBATION IN ALGORITHMS

FOR SOLVING NAVIGATIONAL PROBLEMS Abstract Only c17

A. A. Chernov and V. D. Yastrebov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 11 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 361-368 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

A method is proposed for investigating perturbations in linear algorithms which arise in solution of a number of problems in navigational support of space flights, such as in algorithms for processing trajectory measurements. Solution of various problems in the dynamics of space vehicle flights can be represented in the form y = F(u)r(v), where F(u) is a matrix and r(v) is a vector, dependent on the vector parameters u and v respectively. In each specific problem F(u) and r(v) have a specific sense. In a special case F and r can be dependent on the single vector u = v. The purpose of this investigation is the development of a method making it possible to evaluate perturbations delta y of the solution vector arising during perturbations of the vector parameters u and v. These perturbations can be caused either by rounding off errors or by inexact computation of the F matrix if the expression y = F(u)r(v) is a result of linearization of the expression y = theta (u, r, v) near some control point or inaccuracy in the a priori information used in computing the F matrix. Author

N85-26784# Joint Publications Research Service, Arlington, Va.
STATISTICAL REGULARIZATION METHODS IN PROBLEM OF NAVIGATIONAL DETERMINATION OF SPACE VEHICLE ORBITS Abstract Only c17

A. V. Makshanov, A. A. Musayev, and O. M. Stepanyuk *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 11-12 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 468-471 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Many problems related to determination of space vehicle systems can be reduced to solution of the linear regression problem R = AQ + xi where R < 1:n > is the measurement vector, Q < 1:m > is the vector of the unknown but fully determinable parameters subject to evaluation. It is important to be able to determine the Q parameters of space vehicle orbits under conditions when traditional methods do not ensure the required accuracy. It is possible to use regularized versions of the least squares method, replacing the minimizing problem by its different modifications. It is shown that modification of the standard least squares method procedure makes possible a considerable broadening of the region of observability of a self-determining flight vehicle. The greatest difficulty in this algorithm is computation of the regularization coefficient k. Author

N85-26785# Joint Publications Research Service, Arlington, Va.
OBSERVABILITY IN PROBLEM OF CORRECTION OF INERTIAL NAVIGATION SYSTEMS USING ADDITIONAL INFORMATION FROM ARTIFICIAL EARTH SATELLITE Abstract Only c17

V. I. Kalenova and V. M. Morozov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 12 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 390-398 Original language doc. was announced in IAA as A84-39509 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Results of an observability analysis are used to demonstrate the possibility of using information about the distance between an object and a navigation satellite to correct inertial navigation systems. It is shown that the utilization of this additional information makes it possible to determine all the basic navigation parameters. B.J. (IAA)

N85-26786# Joint Publications Research Service, Arlington, Va.
SPECTRAL CHARACTERISTICS OF PROTONS AT LOW AND HIGH ALTITUDES DURING GEOMAGNETIC STORM OF 29 JULY 1977 Abstract Only c46

A. S. Kovtyukh, M. I. Panasyuk, E. N. Sosnovets, and S. Ya. Reyzman *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 13 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 399-405 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The fluxes of quasitrapped protons were measured with a differential proton spectrometer on Cosmos-900. During the premidnight and daytime hours during a substorm there was an increase in the intensity of the fluxes at the outer L shells, whereas in the evening sector the greatest increase in the fluxes was observed in the inner part of the radiation belts at L = 3-4,5. During a substorm, the hardness of the spectra increased with all MLT values. During the daytime hours a maximum appears in the proton spectra during a substorm, whereas during a magnetically quiet time the spectrum of quasitrapped protons at low altitudes is monotonic. The spectra of protons at different altitudes are similar in both the nighttime and daytime sectors. The joint analysis of the spectral characteristics of protons at low and high altitudes at the time of injection of particles in the outer region of the radiation belts indicates that the formation of fluxes at low altitudes is due to the effect of the adiabatic transport of particles and development of a strong pitch angle diffusion at low altitudes during interaction between particles and ion cyclotron electrostatic waves. Author

N85-26787# Joint Publications Research Service, Arlington, Va.
EXPERIMENTAL RESEARCH ON IONOSPHERIC DISTURBANCE CAUSED BY CUMULATIVE BARIUM VAPOR INJECTION Abstract Only c46

I. A. Zhulin, G. P. Milinevskiy, A. S. Loyevskiy, R. I. Moysya, Yu. A. Romanovskiy, Yu. Ya. Ruzhin, and V. S. Skotarovskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 13-14 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 406-412 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The Spolokh-2 rocket was used to study a cumulative jet of barium vapor and the disturbances arising during deceleration of the plasma jet in the ionosphere. A capsule with an injector was separated upward along the rocket axis with a relative velocity of 10 m/sec and was stabilized by additional rotation. The barium jet was injected at an altitude of 155 km at the trajectory apogee of an MR-12 rocket. The injector had a higher coefficient of transformation of shot energy into jet kinetic energy. It was possible to register effects associated with shock wave propagation in the ionosphere: the collisionless ionization effect, the phenomenon of raking together of plasma, and others. A stimulated leakage of high energy electrons was discovered; this has the nature of artificial pulsations of electron fluxes. The ionospheric phenomena registered during injection of the jet are satisfactorily explained within the concepts of the snowplow theory. It is shown that the stimulated leakages of high energy electrons can be associated with the excitation of MHD waves in the ionosphere during injection of the jet. Author

N85-26788# Joint Publications Research Service, Arlington, Va.
SUBSTORMS IN ENERGETIC RADIATION BELT PARTICLES ACCORDING TO DATA FROM METEOR ARTIFICIAL EARTH SATELLITE Abstract Only c46

Ye. A. Ginsburg and A. B. Malyshev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 14-15 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 413-420 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Electrons with energies > 0.15 and > 0.7 MeV were registered by Geiger counters carried aboard the Meteor-2 (No 1) satellite in a quasicircular orbit with a mean altitude of about 900 km. The mechanisms responsible for substorm variations of fluxes of high energy electrons near the high latitude boundary of the geomagnetic trap are examined, with details being given on phenomena observed during the preliminary and explosive phases of the substorm of 3 March 1976. Particular attention is given to the consequences resulting from the injection of blobs of hot plasma into the core of the magnetosphere. The picture of

the substorm at 1019, 1157, 1415-1716 and 1716 UT is discussed. The nature of the main physical mechanism of variations of structural parameters of the magnetosphere during a substorm was confirmed. Author

N85-26789# Joint Publications Research Service, Arlington, Va.
MEASURING ELECTRICAL FIELD FLUCTUATIONS BY LANGMUIR DOUBLE PROBE METHOD Abstract Only c75
V. Ye. Korepanov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 15 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 421-425 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The components of the total error in measuring quasistationary electrical fields are reviewed and the nature of this total error is now explored. The case of a variable field is considered and the individual components of this error are taken into account and minimized. The procedures for measuring fluctuations of the electrical field in space plasma on which such an analysis is based are described. The different types of errors are examined separately (the total error consists of such components as plasma noise, influence of satellite hull, the dynamic error arising with a change in the measured parameter with time and the dynamic instrument error associated with its inertial properties and determined by the time constants of its different elements). After presenting recommendations on how to minimize these errors, a formula is derived which makes it possible to determine the requirements on the instrumentation and to evaluate the anticipated measurement error. Author

N85-26790# Joint Publications Research Service, Arlington, Va.
MODELING PLASMA MANTLE OF EARTH'S MAGNETOSPHERE Abstract Only c15
I. M. Podgornyy, Yu. N. Potanin, and I. A. Semenov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 16 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 16 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

H. Rosenbauer, et al. (JGR, Vol 80, p 2723, 1975) proposed a mechanism of formation of the high latitude boundary layer (mantle) due to the reflection of charged particles penetrating into the polar cusps from the mirror points and their simultaneous drift onto the nighttime side in crossed electric and magnetic fields. The Rosenbauer model neglects the possible influence of the plasma flow in the boundary layers on the strength of the electric field and the nature of the current in the polar cusp region. A model of the magnetosphere was created with interaction of a super Alfven flow of collisionless hydrogen plasma with a magnetic dipole. The experiment shows that at least the outer part of the mantle can be interpreted as a direct continuation of the boundary plasma layer through the polar cusp. The boundary layer itself is formed on closed magnetic lines in the low latitude region of the daytime magnetopause. A model of filling the mantle of the Earth's magnetosphere is developed which can reflect reality during prolonged existence of a polarization electrical field. The Rosenbauer mechanism cannot be entirely refuted. It may be correct for the inner part of the mantle. There is strong evidence that the model is not applicable to the outer part of the mantle.
Author

N85-26791# Joint Publications Research Service, Arlington, Va.
PERIODICITY OF VARIATIONS IN GALACTIC COSMIC RAY FLUXES AND SOLAR ACTIVITY PARAMETERS NEAR 20TH CYCLE MINIMUM Abstract Only c93
Ye. V. Gorchakov, P. P. Ignatyev, V. P. Okhlopkov, and T. Ye. Shvidkovskaya *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 16-17 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 432-439 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

An autocorrelation analysis of Wolf numbers clearly reveals a two year periodicity in solar activity during the period 1970-1975. Then, up to 1978, no such periodicity was detected and there was no correlation with earlier data (probably attributable to the low level of solar activity and the onset of a new solar activity cycle). Against this background, a correlation analysis was made of the mean monthly fluxes of cosmic rays measured aboard spacecraft, in the stratosphere (at Murmansk) and at the Earth's surface (Deep River), as well as Wolf numbers. The objective was to find a periodicity on the basis of the correlation dependences of two year intervals of data on cosmic rays and Wolf numbers. An approximately two year periodicity in the modulation of cosmic rays was discovered. The manifestation of this periodicity is different for different measurement periods and different energies of galactic cosmic rays. A table gives data on the maxima of the correlation coefficients, the lag relative to Wolf numbers and the extent of the modulation region on the assumption of a plasma velocity of 300 km/sec. The tabulated data characterize the dependence of the extent of the modulation region on the energy of GCR particles. Author

N85-26792# Joint Publications Research Service, Arlington, Va.
IONIZATION COEFFICIENT FOR ATOMIC COLLISIONS IN METEOR TRAIL Abstract Only c90
K. Kh. Saidov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 17-18 Transl. into ENGLISH from Dokl. Akad. Nauk Tadzh. SSR (Dushanbe, USSR), v. 27, no. 7, Jul. 1984 p 372-375 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The author previously derived a semiempirical formula for determining the ionization coefficient beta for the collision of meteor atoms with atmospheric atoms and molecules: beta = 4.70 x 10 to the -15th power v squared (1-E(sub i)/E), where E and v are the kinetic energy and velocity of the meteoroid and E(sub i) is the ionization potential of meteor atoms. This formula is used for computing beta for the mean chemical composition of meteor bodies. Solution of many problems in meteor astronomy, however, require a knowledge of the ionization coefficient for different chemical elements making up meteor matter. The cited formula is used in computing the values of the ionization coefficient for the main components of meteor matter. Computations of beta for the usual atoms were made for meteor velocities 10 to /0 km/sec. Special attention was given to atoms with numbers up to Z = 30. There is a definite regularity in the behavior of the curves of the dependence of the ionization coefficient on atomic number Z.
Author

N85-26793# Joint Publications Research Service, Arlington, Va.
ACCURACY IN PREDICTING ORBITAL MOTION OF ARTIFICIAL EARTH SATELLITE Abstract Only c13
K. V. Kholshevnikov, L. L. Sokolov, Ye. I. Timoshkova, and V. B. Titov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 18 Transl. into ENGLISH from Vestn. Leningrad. Univ.: Mat., Mekh., Astron. (Leningrad), no. 4, Oct. 1984 p 68-71 Original language doc. was announced in IAA as A85-21660 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The perturbing factors affecting the motion of a satellite are analyzed the consideration of which is necessary for the high-precision prediction of orbital motion (1 m top 1 cm). The number of these factors and the complexity of the corresponding models increase sharply as the accuracy is increased. Stochastic properties of the motion then emerge, which makes it impossible to predict satellite trajectories by standard methods with an accuracy that corresponds to the accuracy of the best observations. It is concluded that a new approach to the modeling of satellite motion is needed. B.J. (IAA)

N85-26794# Joint Publications Research Service, Arlington, Va.
INSTABILITY OF SOLAR WIND NEAR STREAMLINED BODIES Abstract Only c92
I. S. Veselovskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 19 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 705-708 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The hydrodynamic instability of waves in the solar wind near planets and comets was studied. It is postulated that the solar wind has a point of stoppage on a contact surface within which it does not penetrate. This case approximately corresponds to reality in the case of flow around some planets and comets. This phenomenon is investigated using a hydrodynamic model of the solar wind (not taking into account additional sources of particles). The flow near such an obstacle is nonuniform and inhomogeneous and this can give rise to instability. The increment is computed and the nature of this instability is analyzed. It is demonstrated that the reason for this instability is inhomogeneity of the velocity field, slowing of the flow and its shearing. A formula is derived for determining the local instability increment. This is followed by calculations of the nature of instability near the point of stoppage in front of and behind the body. A study of the influence of viscosity revealed that the region of unstable wave vectors is narrowed under the influence of viscosity. Author

N85-26795# Joint Publications Research Service, Arlington, Va.
GEOPHYSICAL RESPONSES OF DYNAMICS OF SOLAR WIND TRANSITION REGION Abstract Only **c92**
N. A. Lotova and V. D. Kozlovskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 19-20 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 709-713 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

During recent years much new information has been obtained on the state of the region of formation of the supersonic flow of the solar wind, the transition region situated at a distance of 10 to 20 solar radii from the Sun. These data are used in a study of the responses of solar wind velocity at great distances from the sun and the K(p) index to the temporal dynamics of the transition region. A comparison of all available data reveals the principal features of the dynamics of the transition region of circumsolar plasma:P the main geometrical characteristics of the transition region, its inner and outer boundaries. A particular case is examined for which the transition region was situated at a distance < or = 32 solar radii from the Sun. It is shown that there is a correlation between the geometry of the transition region and the geomagnetic activity level: the closer the transition region is to the Sun, the higher the geomagnetic activity level. The temporal changes in the geometry of the transition region reveal a correlation with solar wind flow, with v(eff), and with the K(p) index. These data may be useful in predicting geomagnetic activity, possibly 6 to 7 days in advanced in comparison with 1 to 2 days when using routine observations of scintillations in regions remote from the Sun. Author

N85-26796# Joint Publications Research Service, Arlington, Va.
VARIATIONS IN INTENSITY OF SECONDARY COSMIC RADIATION OBSERVED ON 10-11 AUGUST 1981 Abstract Only **c93**
A. F. Iyudin, V. A. Kaplin, V. G. Kirillov-Ugryumov, Yu. D. Kotov, Yu. V. Smirnov, V. G. Tyshkevich, and V. N. Yurov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 20 Transl. into ENGLISH from Geomagn. i. Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 719-722 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Quasiperiodic pulsations of the charged and neutral components of secondary cosmic radiation were investigated during 1979 - 1981 during a series of flights of the Nataliya-1M gamma-telescope carried aloft on high-altitude balloons. The results of one such flight at latitude 46 deg N are discussed in detail. The fluxes of different cosmic radiation components were registered the four intensimeters in which information was accumulated for 2 seconds after each triggering of the gamma-telescope. Balloon measurements were made at an altitude of 35 km for 5 hours. The flight was made against the background of a magnetic storm recovery phase. The instrument was oriented to the zenith. The discrete Fourier analysis method was used in detection quasi-periodic pulsations of cosmic radiation particles. Quasiperiodic pulsations of fluxes of particles with periods 1.1 to 1.25, 1.4 to 1.5 and 11.3 minutes were detected. The period 11.3 minutes corresponds to pulsations of the proton component whereas the periods 1.1 to 1.5 minutes correspond to the electron component. Author

N85-26797# Joint Publications Research Service, Arlington, Va.
DETERMINING EFFECTIVE RATE OF PLASMA HEATING IN OUTER EQUATORIAL IONOSPHERE USING DATA FROM ISIS-1 AND ISIS-2 SATELLITES Abstract Only **c75**
N. M. Kashchenko and M. A. Nikitin *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 21 Transl. into ENGLISH from Geomagn. i. Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 733-735 Original language doc. was announced in IAA as A85-14532 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Attention is given to ISIS-1 and -2 measurements of planetary-scale electron temperature at heights of 1400 and 3000 km during periods of high (1969-1970) and low (1971-1973) solar activity. These data are used to determine the effective rate of plasma heating in the equatorial upper ionosphere in conditions of medium solar activity. B.J. (IAA)

N85-26798# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF TROPICAL F REGION IN IONOSPHERE ON PROPAGATION OF SHORT RADIO WAVES Abstract Only **c32**
O. P. Kolomiytsev and P. P. Savchenko *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 21-22 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 740-747 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Tropical ionospheric waveguides in the presence of stratification of the electron concentration maximum were studied. Under these conditions a specific form of vertical electron concentration profile is formed which to a great extent determines the nature and conditions of propagation of short radio waves in the low latitudes. The phase trajectories were computed for a spherically stratified ionosphere. Three approaches for description of the ionospheric waveguide were used: comparative, temporal, latitudinal. Examples of computations are given which show that in a wide spatial-temporal range in the tropical ionosphere there is an additional ionospheric waveguide in which radio waves can be propagated along ricochetting trajectories. At identical time there can be three types of phases trajectories or three types of adjacent channels, each of which is characterized by a definite working frequency and definite conditions for the propagation of radio waves in it. The computations presented give a qualitative representation of the influence of stratification of the electron concentration on the formation, dynamics and degeneration of the additional ionospheric waveguides in the tropical latitudes. Author

N85-26799# Joint Publications Research Service, Arlington, Va.
GLOW OF IONOSPHERIC F-LAYER IN LINE 630 NM DETERMINED FROM PHOTOGRAPHS TAKEN ABOARD SALYUT-6 ORBITAL STATION: INTERPRETATION OF RESULTS Abstract Only **c46**
I. A. Nesmyanovich, G. S. Ivanov-Kholodnyy, and G. M. Nikolskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 22-23 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 748-753 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Photographic observations of the second luminescent layer in the upper atmosphere made from the Salyut-6 station afforded new possibilities for studying the ionospheric F-region. It was necessary to determine whether the registered high intensities agree with data from other surface and space measurements and to ascertain why this layer was not reliably detected during other manned flights. An attempt was made to solve these problems using data published by V. V. Ryumin, et al. The Salyut-6 data were consistent with other measurements and theoretical computations. With an increase in flight altitude from 250 to 350 km the observed surface brightness at the maximum of the luminescent

layer increases by a factor of 1.6. The brightness of the second layer lies near the threshold of visual registry of radiation an therefore even such an increase can favor detection of the glow. The dependence of brightness of the second layer on solar depression and geomagnetic latitude cannot be accepted. The only conclusion that can be drawn is that the maximum brightness of the second layer is observed in the tropial zone and at the near-midnight hours. Author

N85-26800# Joint Publications Research Service, Arlington, Va.
MEASUREMENTS OF FLUXES OF HIGH-ENERGY PROTONS AND ELECTRONS BY 2 OPPOSITELY ORIENTED SPECTROMETERS ABOARD COSMOS-368 ARTIFICIAL EARTH SATELLITE Abstract Only **c93**
L. S. Bratolyubova-Tsulukidze, N. N. Volodichev, O. Yu. Nechayev, I. A. Savenko, A. A. Suslov, and P. I. Shavrin *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 23 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 812-813 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The Cosmos-368 AES carried two identical SEZ-1 scintillation-Cherenkov spectrometers, one of which had its axis of maximum response directed to the zenith, whereas the other was oriented to the nadir (aperture angle of each instrument 45 deg). A similar experiment was carried out on he Cosmos-208 and Cosmos-228 satellites, in the first case with the instrument oriented to the nadir, in the second case, oriented to the zenith. The purpose of the new investigation was to check the conclusions drawn on the basis of measurements made with these two satellites. The observations, at altitudes 200 to 300 km, involved measurements of electrons with E(e) > or = 20 MeV and protons with E(p) > or = 100 MeV, > or = 500 MeV. The following facts were confirmed. There is a so-called inverse latitudinal variation of excess radiation in the equatorial region; there are brief variations in the intensity of registered radiation at all latitudes. In addition, it was possible to evaluate the suitability of the L parameter for describing the latitudinal variation of primary and secondary cosmic rays and to determine the upper limits of fluxes of protons in the region of planetary negative magnetic anomalies. Author

N85-26801# Joint Publications Research Service, Arlington, Va.
BURSTS OF RELATIVISTIC ELECTRONS IN MAGNETOPAUSE AND IN OUTER RADIATION BELT Abstract Only **c93**
I. P. Bezrodnykh, Ye. G. Berezhko, Ye. I. Morozova, N. F. Pisarenko, I. Ya. Plotnikov, and Yu. G. Shafer *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 24 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 818-820 Original language doc. was announced in IAA as A85-14545 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Increases in the intensity of relativistic electrons are observed in the Earth's outer radiation belt. Information was collected from simultaneous observations of fluxes of relativistic electrons in the orbit of a geostationary satellite and near the magnetopause. During 1977 to 1979 more than 10 such events were observed; all were preceded by an increase in solar wind velocity. The data on increases in the density of relativistic electrons near the magnetopause and in the outer radiation belt indicate a close interrelationship between these two phenomena and solar wind velocity. The presence of a layer of shear flow of plasma near the magnetopause indicates that the origin of relativistic electrons may be caused by the process of their frictional acceleration in the layer. Electrons, accelerated near the magnetopause, due to scatterings can enter the region of quasicapture in the tail of the geomagnetosphere where they experience drift motion across the tail and also a process of radial diffusion, as a result of which the electrons penetrate into the radiation belts. The presence of relativistic electrons near the magnetopause may be explained by the frictional process of their acceleration in the layer of shear flow of solar wind plasma adjacent to the magnetopause. Author

N85-26802# Joint Publications Research Service, Arlington, Va.
CORRELATED FLUCTUATIONS OF CHARGED PARTICLE FLUXES AND MAGNETIC FIELD ACCORDING TO DATA FROM INTERCOSMOS-10 SATELLITE Abstract Only 2tra Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 821-823 **c93**
G. A. Glukhov, Yu. P. Kratenko, S. N. Kuznetsov, and Yu. V. Mineyev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 24-25 Original language doc. was announced in IAA as A85-14546 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Observations by Intercosmos-19 during he magnetic storm of 3-5 April 1979 revealed streams of protons of solar cosmic rays (SCR) with energies E(p) > or = 0.9 MeV at latitudes lambda > or = 58 deg. Considerable magnetic field variations were registered at the boundary of the SCR streams. Pulsations of quasitrapped streams of protons and electrons were discovered in the region of these variations. In all the analyzed spectra there is a spectral maximum at a period 15 to 20 sec; in the D-component there is a spectral maximum at a period 3 sec. The nature of these phenomena were investigated using data from simultaneous measurements of streams of charged particles and the geomagnetic field during transit of the satellite through the auroral zone in the afternoon sector in the recovery phase of the strong magnetic storm of 4 April 1979. An analysis indicated that at a period of 15 to 20 sec there is a predominance of a magnetosonic mode of the wave and at a period of 2.5 to 3 sec -an Alfven wave mode. The period of pulsations of the intensity of electrons with E(e) = 0.6 to 0.9 and 0.9 to 1.2 MeV indicated that the period of pulsations of the intensity of these electrons is also 15 to 20 sec, indicating that the period of the pulsations is not dependent on energy. The different possible hypotheses for explaining these pulsations are reviewed. Author

N85-26803# Joint Publications Research Service, Arlington, Va.
TASS UPDATE ON FLIGHTS OF VEGA-1 AND VEGA-2 Abstract Only
In its USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 26 Transl. into ENGLISH from Mosk. Pravda (Moscow), 1 Mar. 1985 p 3 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The flight of the automatic interplanetary stations Vegal-1 and Vega-2, which are intended for studies of the planet Venus and Halley's Comet, is now into its third month. During the time that has elapsed, 67 periods of radio communication have been conducted with the stations. Measurements have been made of parameters of the stations' trajectories of movement, the operation of onboard systems has been monitored, and scientific and telemetry information has been transmitted to Earth during these periods. The Vega-1 and Vega-2 stations are continuing to move along paths that are close to the calculated ones. Measurements of characteristics of galactic and solar cosmic rays, magnetic fields and interplanetary plasma are being made from the stations in the course of their flight along the Earth-to-Venus route. G.L.C.

N85-26804# Joint Publications Research Service, Arlington, Va.
KOVTUNENKO DISCUSES VEGA PROJECT
In its USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 27-29 Repr. from Moscow News (Moscow), no. 50, 23-30 Dec. 1984 p 12 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The Vega project is based on an ingenious idea of a consecutive flight first to Venus, and then to Halley's comet. The possibility arose due to the unique position of Venus and the comet near its perihelion, i.e., the point of the maximum approach of the comet's orbit to the Sun. This makes it possible to direct the spacecraft to Halley's comet by means of a gravitational maneuver in the Venus field of gravity after the spacecraft has flown past the plant. G.L.C.

N85-26805# Joint Publications Research Service, Arlington, Va.
FRENCH AND WEST GERMAN EQUIPMENT FOR VEGA PROJECT Abstract Only
L. Kondrashevskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 30 Transl. into ENGLISH from Sov. Kirgiziya

(USSR), 2 Feb. 1985 p 4 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The functions of two instruments which are installed on modules of Venus project spacecraft that will be released from the interplanetary stations and descend through Venus' atmosphere. The instruments are an ultraviolet spectrometer and an aerosol recorder. The Soviet bureau and the West Germans reportedly developed an instrument called PUMA, which is an acronym of dust-impact mass analyzer. The chemical and isotope composition of particles surrounding the head of Halley's Comet will be analyzed with the aid of this instrument. G.L.C.

N85-26806# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF SHORT-PERIOD CHANGES IN INTENSITY OF HARD X-RADIATION OF SOLAR FLARES REGISTERED ABOARD VENERA-13 AND VENERA-14 SPACECRAFT Abstract Only **c92**
S. V. Bogovalov, A. F. Iyudin, Yu. D. Kotov, Ye. V. Shugal, V. Sh. Dolidze, V. M. Zenchenko, G. Vedrenne, M. Niel, C. Barat, C. Shambon et al *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 31 Transl. into ENGLISH from Pisma v Astron. Zh. (Moscow), v. 10, no. 9, Sep. 1984 p 685-690 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Solar flare information obtained using the Venera-13 and Venera-14 (which carried SNEG-2M3 instruments) for the period up to 30 May 1981 is reported. The basis for the study was 140 records of solar events with a duration of 16 sec with a resolution of 1/64 sec and with a duration of 64 sec with a resolution of 0.5 sec. Data were processed in two stages. All 140 flare records were first subjected to Fourier analysis. If a reliable peak was discovered in the power spectrum of some event a further analysis of this event was made by a different method. The maximum entropy method was used since it has the best frequency resolution for short records of time series. The results of this analysis (and H alpha data) are tabulated. Each event is briefly discussed. The events of 27 and 29 March 1982, for example, corresponded to a region measuring 9.8x10 to the 18th cm. The events evidently occurred in the solar corona. The common source was characterized by quasiperiodic changes in the intensity of hard X-radiation. Author

N85-26807# Joint Publications Research Service, Arlington, Va.
MECHANISM OF FORMATION OF LOW TEMPERATURES IN NIGHTTIME VENUSIAN THERMOSPHERE **c91**
B. G. Gordiyets and Yu. N. Kulikov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 32 Transl. into ENGLISH from Pisma v Astron. Zh. (Moscow), v. 10, no. 9, Sep. 1984 p 696-701 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Anomalously low temperatures of the Venusian nighttime thermosphere were discovered but have not been theoretically explained. This temperature in the neighborhood of the antisolar point decreases with altitude from approximately 170 K at 100 km to 100-130 K in the exosphere region at 150-160 km. Such a temperature profile was not predicted in any theoretical model. The Venusian nighttime thermosphere is not a region with increased temperatures and a positive vertical temperature gradient, but is in actuality a cryosphere. No efforts have been made to explain this phenomenon. A mechanism is proposed for explaining the exceedingly low temperatures of the Venusian nighttime upper atmosphere: cooling by IR radiation in the rotational band of H20 molecules. the phenomenon was quantitatively described using a theoretical model which in the altitude range 100-170 km in the neighborhood of the antisolar point made it possible to compute the vertical profiles of temperature and the CO2, CO, 0 and H20 concentrations. Author

N85-26808# Joint Publications Research Service, Arlington, Va.
ORIENTATION AND STRENGTH OF MARTIAN MAGNETIC DIPOLE Abstract Only **c91**
Sh. Sh. Zhuzgov and V. A. Sharova *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 32-33 Transl. into ENGLISH from Kosmich. Issled. (Moscow), v. 22, no. 3, May - Jun. 1984 p 440-449 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Magnetograms obtained by the Mars-2 satellite, not published earlier, in combination with Mars-3 and Mars-5 data, have yielded important information concerning the Martian magnetic field making possible clarification of the nature of the field on the daytime side of Mars, between the shock wave front and the planet, on orientation of the dipole and extent of the Martian magnetosphere on the nighttime side and on the strength of the dipole magnetic moment. All the measurements of Mars-2, Mars-3 and Mars-5 are consistent and further clarify earlier findings. The axis of the Martian magnetic dipole is tilted about 15 deg. to the axis of rotation with the north pole of the dipole being situated at a longitude of about 270 deg. in the Southern Hemisphere. On the daytime side of the planet there is a field belonging to the planet and rotating together with the planet. Author

N85-26809# Joint Publications Research Service, Arlington, Va.
POSSIBLE CONFIGURATION OF MARTIAN MAGNETOSPHERE Abstract Only **c91**
V. N. Smirnov and I. L. Izraylevich *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 33-34 Transl. into ENGLISH from Kosmich. Issled. (Moscow), v. 22, no. 3, May - Jun. 1984 p 450-456 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

A new quantitative analysis was made of the results of magnetic field measurements near Mars for determining its strength. The orientation of the magnetic moment and the configuration of the Martian magnetosphere are also discussed. The measurement data used were from Mars-3 and Mars-5 satellites. A very simple model was used in the computations. The field measured within the interaction region was represented in the form of the sum of the characteristic dipole field and the external uniform field. It was found that the axis of the Martian magnetic moment is situated near the planetary axis of rotation. Diple polarity is the same as for the Earth, but the north magnetic pole is situated in the Southern Hemisphere. The configuration of the magnetic field in the neighborhood of the planet reveals that the planet has a characteristic degenerate magnetosphere in which, due to the merging of the cusps, there is a characteristic region which, like a part in the hair, separates the magnetic field lines emanating from different poles. An induced magnetic barrier can exist over this characteristic region on the daytime side of the planet. Author

N85-26810# Joint Publications Research Service, Arlington, Va.
POSSIBLE PERIOD OF JOVIAN ACTIVITY AND POSSIBILITY OF SEASONS Abstract Only **c91**
A. P. Vidmachenko, A. F. Steklov, and N. F. Minyaylo *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 34 Transl. into ENGLISH from Pisma v Astron. Zh. (Moscow), v. 10, no. 9, Sep. 1984 p 691-695 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

A study was made of the factors which might be responsible for the long- and short-period variations of the physical and photometric properties of the Jovian atmosphere. The investigation was based on published observational data for the year 1953-1983 relating to the relative brightness distribution along the central meridian of the planet. The spectral ranges considered were 0.51 and 0.37-0.40 microns. During the considered period the greatest reflectivity variations occurred in the southern and northern tropical zones (STrZ and NTrZ), which were alternately the brightest details on the disk. Author

N85-26811# Joint Publications Research Service, Arlington, Va.
RESEARCH ON ZERO-GRAVITY BOTANY APPARATUS Abstract Only
S. Lapenis *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 35 Transl. into ENGLISH from Komsomolskaya Pravda (USSR), 2 Feb. 1985 p 3 (For primary document see N85-26772 16-12)

Avail: NTIS HC A06

During a long flight of Soviet cosmonauts on board a Salyut station, a plant was cultivated which passed through all stages of growth. Scientists are studying effects of terrestrial gravity on the spatial orientation of plants and processes of their growth and morphogenesis, and they are developing new experimental apparatus for space stations. A unit for growing plant cultures, controlling their growth and studying their internal processes in zero gravity was fabricated. G.L.C.

N85-26812# Joint Publications Research Service, Arlington, Va.
STRUCTURAL-FUNCTIONAL CHANGES IN BACTERIAL CELLS UNDER SPACEFLIGHT CONDITIONS Abstract Only
S. N. Zalooguyev, S. V. Prozorovskiy, L. N. Kats, F. M. Kirillova, V. L. Popov, A. F. Moroz, N. G. Antsiferova, L. I. Glatman, M. P. Bragina, V. M. Shilov et al *In its* USSR Rept.: Space (JPRS-USP-85-004) p 36 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 278, no. 5, Oct. 1984 p 1236-1237 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

A study was made of the structure and process of toxin formation in bacteria during spaceflight in the joint Soviet-French Tsitos-2 experiment carried out aboard the Soyuz-T5-Salyut-7-Soyuz-T6 orbital complex in July 1982. The experiment was original in that it was carried out in the oribtal flight phase with bacteria cultivated in vitro, whereas earlier such experiments were with biological material which had completed flight. The studied strains were E. coli and Staphylococcus aureus (taken from a cosmonaut) and laboratory strains of E. coli and Pseudomonas aeruginosa. Technical details of the experiment are given. Study of these strains over the course of the experiment failed to reveal clearly expressed differences in the cytoplasm, but the cell walls in the space variant had thickened considerably (89 nm) in comparison with the control (28 nm). The periplasmic space had expanded due to withdrawal of the cell wall membrane from the cytoplasmic membrane. These and other data make it possible to conclude that there are no well-expressed changes in the submicroscopic organization on bacteria, other than the cell wall thickening. Author

N85-26813# Joint Publications Research Service, Arlington, Va.
SPACE POWER PLANTS c44
Sergey Andreyevich Khudyakov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 37-56 Transl. into ENGLISH from Kosmich. Energ. (Novoye v Zhizni, Nauke, Tekhn.: Ser. Kosmonavtika, Astron.) (Moscow), no. 7, Jul. 1984 p 36-63 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Power generators in space are examined. A semiconducting photoelectric converter (FEP) which converts the energy of solar radiation directly into electrical energy is discussed. The operating principle of an FEP is based on the interaction of solar light with a crystal semiconductor, in the process of which the photons produce free electrons, carriers of an electrical charge, in the crystal. Areas with a strong electrical field created specially under the effect of the p-n junction trap the freed electrons and divide them in such a fashion that a current and corresponding electrical power appear in the load circuit. The absorption of light in metals and pure semiconductors is outlined. E.A.K.

N85-26814# Joint Publications Research Service, Arlington, Va.
CONSTRUCTION AND FUNCTIONING OF EXTENDED ORBITAL SYSTEMS Abstract Only
G. M. Moskalenko and A. V. Andreyev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 57 Transl. into ENGLISH from Kosmich. Issled. (Moscow), v. 22, no. 3, May - Jun. 1984 p 457-467 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

An extended or elongated orbital system is presented. The concept of regular motion of an extended system is introduced and stationary and nonstationary cases of this motion are examined. The mass-geometrical characteristics of the system are computed. Rules for the construction and transformation of different systems are formulated for motion of the chain in a circular orbit with its orientation along the radius vector. The problem of system computation is separated into dynamic and constructive-geometrical parts. General laws of system deployment are established for the class of motions. Analytical formulas are derived for evaluating system parameters in different operation regimes. E.A.K.

N85-26815# Joint Publications Research Service, Arlington, Va.
ION SENSOR SIGNAL FLUCTUATIONS DURING OPERATION OF SPACECRAFT REACTION ENGINES Abstract Only c20
V. P. Legostayev, V. D. Nikolayev, K. I. Saulin, M. B. Sukhovoy, and Ye. G. Ulyanov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 58 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Experimental data on the effect of reaction engines on ion detector signals and empirical rules are formulated to apply to the design of ion orientation circuits. The effect of different engine systems with different thrust and working medium are described. The Cosmos satellites used compressed air as the working medium. It is shown that the effect of a reaction engine on the total ion current persists to an altitude of 2,000 km; the amplitude of the effect is dependent on engine thrust and changes along the space vehicle flight trajectory. It is found that with orbital orientation the amplitude and phase of the engine effect on ion detector signals change along the flight and trajectory; this dependence remains the same for different types of space vehicles, for different thrusts and different types of jet engine fuel. The gas jets exert a definite influence on the interaction between a space vehicle and the oncoming flow of ions during operation of the reaction engines in the orientation system. This results in fluctuations of ion detector signals indicating, that there is a redistribution of ion concentration along the front of the oncoming flow. The gas jets exert an influence on ion detector signals regardless of whether the working medium is compressed air, hydrogen peroxide or a two-component fuel. The amplitude, duration and phase of fluctuation of ion detector signals are determined by engine thrust, quantity of escaping gas and direction of the gas jet. Changes in the amplitude and phase of the effect of gas jets correlate with changes in componets of the Earth's magnetic field in an orbital coordinate system. E.A.K.

N85-26816# Joint Publications Research Service, Arlington, Va.
HELIOCENTRIC SAIL PROBLEM WITH VARIABLE GRAVITY FIELD REDUCTION Abstract Only c90
Ye. N. Polyakhova *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 58-59 Transl. into ENGLISH from Vestn. Leningr. Univ.: Mat., Mekhan., Astron. (Leningrad), no. 4, Oct. 1984 p 63-68 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Motion of reflecting bodies in a central photogravitational field is the Tsander motion. Restricting the examination to elliptical Tsander trajectories corresponding to a perdominance of attraction over repulsion and with Tsander unperturbed motion serving as the basis with a constant reduction of solar mass, it is possible to examine perturbed Tsander motion in the presence of some constantly operative perturbing acceleration and take the variability of solar field reduction into account. The problem of gradual deterioration of a solar sail was studied. A gradual worsening of the optical characteristics of the sail during a flight occurs under the influence of such space factors as a deep vacuum, micrometeorites, corpuscular streams, gamma radiation and high energies. A worsening of the optical characteristics is accompanied by an increase in transparency of the sail film, erosion, turbidity and darkening of material as a result of exposure to high temperatures. Changes in the physical parameters of a solar sail exert a considerable influence on the nature of orbital Tsander motion. Allowance for deterioration of the sail is important in predicting the motion of a space vehicle with a solar sail in a Tsander elliptical orbit. E.A.K.

N85-26817# Joint Publications Research Service, Arlington, Va.
APPLICATION OF SPACE METHODS IN GEODESY c43
Anatoliy Mikhaylovich Mikisha *In its* USSR Rept.: Space

(JPRS-USP-85-004) 6 May 1985 p 60-66 Transl. into ENGLISH from Kosmich. Metody v Geod. (Novoye v Zhizni, Nauke, Tekhn.: Ser. Kosmonavtika, Astron.) (Moscow), no. 9, Sep. 1984 p 43-50; 56-58 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The development of space geodesy is discussed. The perfecting of laser and radio-technical equipment, the installation of corner reflectors on artificial Earth satellites, the delivery to and placement of such reflectors on the surface of the Moon and the launch of space vehicles toward distant objects in the Solar system - all these and other factors in the rapid development of space technology and methods for tracking objects in space have increased the possibilities for space geodesy. E.A.K.

N85-26818# Joint Publications Research Service, Arlington, Va.
TECHNOLOGICAL EXPERIMENTS ON HIGH-ALTITUDE ROCKETS
M. S. Agafonov, V. L. Levtov, and V. V. Savichev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 67-77 Transl. into ENGLISH from Zemlya i Vselennaya (Moscow), no. 5, Sep. - Oct. 1984 p 27-34 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The production of new, improved and unique materials in space is discussed. Experiments on high-altitude rockets are for establishing the scientific principles of such production. The conditions for carrying out experiments with high-altitude rockets and on stationary orbital space vehicles differ with respect to the level of microaccelerations characterizing the state of on-board weightlessness. Gaining a velocity several times less than is required for orbital flight, the rocket beyond the dense layers of the atmosphere moves as a body during free falling. At altitudes greater than 250 km, the rocket velocity is already insignificant and the braking caused by atmospheric drag becomes increasingly less. Direct measurements revealed that the level of microaccelerations in the passive segment of rocket flight is not greater than 10/6g0, whereas on a station it is 10/3-10/4g0. Significant feature of research aboard a rocket is a relatively brief duration of the state of weightlessness. The implementation of experiments under such conditions requires the use of many accelerated regimes of melting and crystallization. And nevertheless there are many materials of practical interest whose technological processing is feasible during this time without sacrifice of quality. E.A.K.

N85-26819# Joint Publications Research Service, Arlington, Va.
SVIT COMPLEX FOR ANALYSIS OF SPACE PHOTOGRAPHY c35
Ye. Nelepo *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 78-79 Transl. into ENGLISH from Mosk. Komsomolets (Moscow), 15 Jan. 1985 p 4 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

A new computerized image-processing complex was analyzed. The complex is the self-contained video information terminal (SVIT). State-of-the-art space technology makes it possible to obtain number of pictures of the planet's surface. Photographs from space represent a qualitatively new type of information. The SVIT stores several pictures at the same time, display them on a television monitor and performs certain operations for the transformation of the images: enlarging and reducing, shifting individual parts and presenting black-and-white pictures in legend colors. The aerospace video-information processing system must be interactive. In addition to a conventional computer memory, The new complex has a special video-information storage device which permits the storing of as many as 10 pictures at once. The fact that pictures take up a very large space in a computer's memory makes such a device necessary. E.A.K.

N85-26820# Joint Publications Research Service, Arlington, Va.
TENTH CONFERENCE OF WORKING GROUP OF SOCIALIST COUNTRIES ON REMOTE SENSING OF EARTH UNDER INTERCOSMOS PROGRAM Abstract Only c43
V. V. Yegorov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 81 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 111-113 Conf. held in Ulan-Bator, USSR, 26 Jun. - 2 Jul. 1984 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Work on remote sensing of the Earth (WGRS) and the research planned for 1986-1990 was discussed. The first stage of the Black Sea experiment was carried out in August-September 1983. Data on hydrophysical, biological and optical parameters of the sea surface were collected from the Soyuz-7 and Meteor-Priroda satellites, and AN-30 flying laboratory. Spectral and multilevel photographic and biogeophysical measurements were made of soil-vegetation complexes. Surface spectrometric measurements of natural pasture vegetation in Mongolia were supplemented by a photographic survey from the Salyut-7. A report on the Gobi-Khangay-81 experiment was presented. Preparations for a multilingual terminological-interpretive dictionary of remote sensing terms are being completed. Four main themes are emphasized: study of geosystems by remote methods; study of world ocean and closed water bodies with allowance for influence of atmosphere; study of geological structures by remote methods; improvement of methods and instrumentation for remote measurements and processing of results. Methods for remote sensing in geological research was discussed. E.A.K.

N85-26821# Joint Publications Research Service, Arlington, Va.
YEAR-TO-YEAR VARIABILITY OF COMPONENTS OF EARTH'S RADIATION BUDGET ACCORDING TO SATELLITE MEASUREMENT DATA Abstract Only c46
G. K. Marchuk, K. Ya. Kondratyev, O. A. Avaste, V. V. Kozoderov, and O. Yu. Kyarner *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 81 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 280, no. 1, Jan. 1984 p 65-70 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The year-to-year variability computed on satellite measurements with scanning radiometers carried by polar orbit satellites were analyzed. Solar-synchronous orbits carried out measurements over the same territory twice each day. The data wre reduced to mean monthly values of the fluxes of outgoing short and long-wave radiation. The analysis of year-to-year variability was based on mean monthly values of the radiation budget, its short and long-wave components and incident solar radiation. The results of computations of the standard deviations of the radiation budget and its components relative to their mean monthly values are represented in three full-page isoline maps. Regions of significant year-to-year variability: Sahara Desert, Kuroshio Current, Gulf Stream Region, Peruvian upwelling, near Cape Horn, in Gulf of Guinea, east of Newfoundland, tropical Atlantic near South America, deserts of Central Asia and South Africa, certain parts of Pacific Ocean , Norwegian Sea. The radiation budget albedo componet, whose main variability is associated with cloud cover is shown. The greatest variability is in the equatorial regions of the Pacific, Indian and Atlantic Oceans. The year-to-year variability of the long-wave component is shown; the highest values are in the Sahara Desert, along the east coast of the Asiatic continent and in North America. The satellite data made it possible to differentiate regions of year-to-year variability with an amplitude of the radiation temperature of the system of 4-5 K. E.A.K.

N85-26822# Joint Publications Research Service, Arlington, Va.
ONE APPROACH TO REMOTE SENSING OF TOTAL OZONE CONTENT Abstract Only c46
G. A. Ryzhikov, M. S. Biryulina, and V. V. Rozanov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 82 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 14-20 Original language document was announced in IAA as A85-25652 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The paper examines the possibility of using an approach based on the information-value equation to determine the total ozone content (TOC) in the atmosphere from measurements of IR outgoing radiation and scattered UV radiation without introducing

a priori information. Specifically, attention is given to the inverse problem of determining the TOC from satellite measurements of outgoing IR radiation at 9.6 microns and scattered UV radiation at 0.25-0.31 micron. Errors due to the inadequacy of the statistics used are evaluated, and it is shown that the main error in determining the TOC is the bias error. B.J. (IAA)

N85-26823# Joint Publications Research Service, Arlington, Va.
SCHEME FOR ATMOSPHERIC THERMAL SENSING FROM SATELLITES WITH ENHANCED VERTICAL RESOLUTION Abstract Only **c46**
A. B. Uspenskiy, V. M. Sutovskiy, and V. Ye. Tretyakov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 82-83 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 53-58 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

According to theoretical estimates and the results of processing of satellite information, for existing remote thermal sensing systems and artificial Earth satellites the mean square error in determining temperature delta sub T and vertical resolution in the troposphere (in the layer p > or = 100 gPa) is 2.5 K and 4-5 km, which does not meet the requirements of numerical forecasting schemes (about 1.5 K and 2 km). The objective of this article is a brief analysis of the definitions and quantitative evaluations of vertical resolution in the inverse problem of remote thermal sensing using an approach developed by the authors for evaluating the possibility of improving the accuracy and resolution of the results of remote thermal sensing by use of a scheme in which measurements of outgoing IR radiation in several spectral intervals are combined with similar measurements at several angles to the nadir. Emphasis is on increasing vertical resolution by a combination of nadir and slant soundings. B.W.

N85-26824# Joint Publications Research Service, Arlington, Va.
STUDY AND MAPPING OF ANTHROPOGENIC EFFECT ON ENVIRONMENT IN DIFFERENT REGIONS OF USSR ON BASIS OF SPACE PHOTOGRAPHS Abstract Only **c43**
I. S. Kontoboytseva and V. I. Kravtsova *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 83 Transl. into ENGLISH from Vestn. Mosk. Univ., Ser. 5: Geografiya (Moscow), no. 6, Nov. - Dec. 1984 p 1118 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The article gives the results of experiments for compilation of maps of the anthropogenic effects on the environment. The work was based on the most used types of space photographs: high-resolution scanner photographs and photo-images from manned spaceships and orbital stations. Photographs were analyzed from four regions (Northern Dvina Basin, Lower Volga Region, Ustyurt Plateau, Karakum Desert and oases). The maps show type of land use and the unfavorable effects of land use. Multizonal scanner photographs from the Meteor satellite were used in mapping the anthropogenic effect on forest vegetation of the headwaters of the Northern Dvina, with interpretation in three zones: orange (0 .6-0.7 micrometer), red (0.7-0.8 micrometer) and near-IR (0.8-1.1 micrometer). The anthropogenic effect in grain cultivation regions was mapped using scanner photographs of the Lower Volga region from the LANDSAT satellite. Mapping of the anthropogenic effect on desert landscapes was carried out in the Ustyurt Plateau from a scanner photograph taken from the Meteor satellite. Another desert section (with oases) in the Karakum Desert was mapped using a photograph taken from the Salyut-4 orbital station. B.W.

N85-26825# Joint Publications Research Service, Arlington, Va.
MULTIPLE REGRESSION ANALYSIS OF PHOTOGRAPHIC IMAGE OF SOIL PROPERTIES Abstract Only **c43**
B. V. Vinogradov, C. Riedel, and A. N. Kaptsov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 84 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 278, no. 5, Oct. 1984 p 1274-1277 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Surface and remote studies of the spectral properties of soils and characteristics of the photographic image on multizonal photographs were carried out in an aerospace test range in the GDR central plain. An aerial survey was made with an MKF-6 camera; surface photographs of standard soil samples were taken in the same spectral intervals. The experiments were carried out under natural conditions with diffuse illumination. Only air-dried soil samples were used. The optical density of the image of each soil and an optical wedge were measured on the negatives. A target measuring 1 x 1 cm with 10,000 measured values was selected on the image of each soil and the mean optical density of the negative was then computed. All measurements were scaled to the optical density of the positive image. The correlation between the optical density of the positive photographic image D sub pos and the soil properties (humus content, iron oxides and carbonates) in the upper genetic soil horizon was measured. The multiple regression equation and its derivatives are useful in interpreting aerospace images of soils. B.W.

N85-26826# Joint Publications Research Service, Arlington, Va.
IDENTIFICATION OF STRUCTURE OF SOIL-VEGETATION COVER USING AERIAL AND SPACE PHOTOGRAPHS Abstract Only **c43**
S. M. Gorozhankina and V. D. Konstantinov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 84-85 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 42-52 Original language document was announced in IAA as A85-25656 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The paper describes a method for the identification and mapping of the tructure of the vegetation and soil cover of taiga landscapes on the basis of aerial and space photographs in the scale range from 1:10,000,000 to 1:15,000. Meteor-satellite photographs of western Siberia are used. The main features of meta-, and macro-, meso-, and micro-structures are characterized. B.J. (IAA)

N85-26827# Joint Publications Research Service, Arlington, Va.
USE OF GOUDRIAN MODEL IN STUDYING LAWS OF REFLECTION IN VEGETATION-SOIL SYSTEM IN OPTICAL RANGE. 2: INFLUENCE OF ILLUMINATION CONDITIONS ON SPECTRAL BRIGHTNESS COEFFICIENTS Abstract Only **c43**
N. N. Vygodskaya and I. I. Gorshkova *In its* USSR Rept: Space (JPRS-USP-85-004) 6 May 1985 p 85-86 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 69-77 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06/MF A01

The results of numerical experiments based on the Goudrian model are given. These results characterized the laws of change of the spectral brightness coefficients (b lamda) of the vegetation-soil system as a function of density (L) of the vegetation cover (VC), type of spatial orientation of phytoelements, spectral reflection and transmission coefficients (rho ph, tau ph) of individual phytoelements (assuming rho ph = tau ph) and coefficients of spectral reflection of the soil (rho sub s) with sighting to the nadir (theta sub o = 0 deg) and with a solar altitude greater than 55 deg. The authors give the influence of solar altitude and S lambda/D lambda (S = direct, D = scattered radiation) on the spectral brightness coefficient in the visible and near-IR solar spectrum ranges with sighting to the nadir. Due to the invariance property (b lambda (solar altitude, theta sub 0) = b lambda theta sub 0, solar altitude with S lambda >> D lambda the laws of change of b lambda as a function of solar altitude for the nadir are identical to the laws of change of b lambda as a function of theta sub 0 for the sun at the zenith. It was found that in he solution of inverse problems, the lesser the dependence of the spectral brightness coefficient on the VC canopy density, optical properties of the soil and individual phytoelements, the greater is the need for taking the influence of . B.W.

N85-26828# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF MESOFISSURING ON SPACE PHOTOGRAPHS:

NEW TECHNIQUE FOR STUDY OF PETROLEUM AND GAS DEPOSITS Abstract Only c43
G. I. Amurskiy, G. A. Abramenok, and M. N. Solovyev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 86 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 36-41 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

Zones of mesofissuring are linear (or in the case of their intersection by systems of a different strike, linear-focal) zones of reduced density, within whose areas increased fluid conductivity of rocks is ensured by a branched system of so-called tectonic channels of different scales from ordinary disjunctive dislocations to microfissures. On large-scale photographs these zones of mesofissuring can be discriminated in the form of zones of increased density of relatively short (0.5-4 km) lineaments with a width up to several kilometers and with a length of many tens of kilometers. They are characterized by the following: (1) sustained orientation of individual elements; (2) complex unambiguous relationship to known faults; (3) nondependence on local plicative tectonics (the width of the zone of microfissuring frequently exceeds the dimensions of the folds; and (4) presence of systems of fissures of different morphology, such as stepped, sawtooth and echeloned arrangements). Since the formation of such zones results in the appearance of extended zones of intensive reduced density of rocks, their tracing and projection onto the level of productive strata can serve as a basis for solving important problems in study and exploitation of petroleum and gas deposits. B.W.

N85-26829# Joint Publications Research Service, Arlington, Va.
MINIMIZING INFLUENCE OF EARTH'S CURVATURE IN PROJECTIVE RECTIFICATION OF SPACE PHOTOGRAPHS INTO PHOTOPLANS AND PHOTOMAPS Abstract Only c43
A. M. Kuzina, N. S. Ramm, and A. P. Skorodumov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 87 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 101-106 Original language document was announced in IAA as A85-25662 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The geometrical correction of space photographs required for their rectification into photoplans and photomaps in a particular projection is usually accomplished without allowance for local relief and involves elimination of the influence of tilt and the Earth's curvature. In this article it is shown that this correction can be considerably simplified by replacing the coupling of space photograph coordinates and the photoplan (photomap) by a projective (linear-fractional) dependence. Such a replacement makes it possible to rectify space photographs on standard photorectifiers. It also makes possible a sharp increase in the efficiency of digital rectification of space photographs. It has been stated that in virtually all cases these procedures would result in a considerable decrease in the accuracy of the compiled maps of plans. It is demonstrated that with an effective choice of the projective correspondence the residual errors are decreased by several times and accordingly there is a broadening of the field of application of projective rectifications of space photographs. B.W.

N85-26830# Joint Publications Research Service, Arlington, Va.
FORECASTS ON LONG-RANGE DEVELOPMENT OF SPACE PROGRAMS
V. Senkevich *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 88-93 Transl. into ENGLISH from Krylya Rodiny (Moscow), no. 11, Nov. 1984 p 16-17 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The long range objectives of the U.S.S.R. space program are discussed. Future research initiatives include: (1) the development of an orbital space station; (2) lunar exploration; and (3) deep space exploration. Areas of international cooperation are also discussed. B.W.

N85-26831# Joint Publications Research Service, Arlington, Va.
US SAID TO SEEK MILITARY ADVANTAGE IN SPACE
V. S. Avduyevskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 94-100 Transl. into ENGLISH from Zemlya i Vselennaya (Moscow), no. 5, Sep. - Oct. 1984 p 6-11 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The use of space weapons in the nuclear arms race in the U.S. and the U.S.S.R. are discussed. Plans for establishing an antimissile defense system in the U.S. are examined. The Soviet position on peaceful activity in space is described. Efforts aimed at forestalling the militarization of space are discussed. B.W.

N85-26832# Joint Publications Research Service, Arlington, Va.
MILITARY JOURNAL ON US INTELLIGENCE SATELLITES
N. Gavrilov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 101-109 Transl. into ENGLISH from Zarubezhnoye Voyennoye Obozreniye (Moscow), no. 11, Nov. 1984 p 54-59 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

The new round in the arms race that was started by the present U.S. administration has been embodied in the militarization of near space. A directive to the Department of Defense sanctions it to undertake actions in space to support our right to self-defense, to insure regularity of access to space, and to achieve a high degree of operational readiness, viability and security of the space facilities needed for the national space system. Spacecraft and facilities used in space surveillance activities are examined. B.W.

N85-26833# Joint Publications Research Service, Arlington, Va.
EAST EUROPE REPORT: SCIENCE AND TECHNOLOGY
24 Aug. 1984 64 p refs Transl. into ENGLISH from various East European articles
(JPRS-ESA-84-032) Avail: NTIS HC A04/MF A01

News items, abstracts, and scientific reports on aspects of science and technology including robotics, space research, nuclear power plants, laser applications, radioactive isotopes, computer techniques, mathematical modeling, and soldering are covered. For individual titles, see N85-26834 through N85-26834.

N85-26834# Joint Publications Research Service, Arlington, Va.
CONTRIBUTION TO SPACE PROGRAM REVIEWED
Dimitur Mishev *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-84-032) 24 Aug. 1984 p 3-4 Transl. into ENGLISH from Zemedelsko Zname (Sofia), 10 Jul. 1984 p 3 (For primary document see N85-26833 16-12)
Avail: NTIS HC A04/MF A01

The Meteor-Priroda satellite was launched in order to solve a number of problems and tasks related to the remote sensing of the Earth from space. In order to make effective use of the data and images obtained methods and algorithms for multivarious processing by specialized computer systems were developed. The first steps toward solving the problems of spectrum-structural analysis, spectrocalorimetrical systems, and modeling the operation of an orbitrary system for studying natural resources were made by the Bulgarian 1300-2 project. B.G.

N85-27795 Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
THE HELIOS MISSIONS [DIE HELIOS-MISSIONENT]
Ants Kutzer *In* DFVLR Ten Years of Helios 1984 p 39-44 In ENGLISH and GERMAN (For primary document see N85-27794 16-92)
Avail: Issuing Activity

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N85-26835# Naval Postgraduate School, Monterey, Calif.
DISPERSION SENSITIVITY OF THE EIGHT INCH ADVANCED

RAMJET MUNITIONS TECHNOLOGY PROJECTILE DUE TO WIND AND MINOR THRUST ERRORS M.S. Thesis
S. R. Poole Sep. 1984 177 p
(AD-A152145; NPS67-84-015) Avail: NTIS HC A09/MF A01 CSCL 19/4

Advanced Ramjet Munitions Technology (ARMT) is an ongoing DARPA project to research ramjet munitions. The ARMT eight inch projectile uses ramjet thrust for a boosted trajectory, but operates on a thrust drag balance concept to create pseudovacuum trajectory during powered flight. The trajectory was analyzed using an IBM-370 computer simulation for three and five degrees of freedom. Work was also done to adapt the Ballistics Research Laboratories six degrees of freedom program to the IBM system. Projectile aerodynamic and mass properties were obtained from the Norden Systems Wind Tunnel Data. Dispersion from the vaccuum trajectory due to wind prior to ramjet burnout proved minor. Dispersion due to constant thrust errors under 5% was within a 600 radius at terminal guidance over a range of 33 miles. GRA

N85-26836# Centre National d'Etudes Spatiales, Toulouse (France). Div. Mathematiques Spatiales.
SIMULATION OF A LOW ORBIT RESTITUTION. COVARIANCE ANALYSIS OF THE POSITION-VELOCITY BY DOPPLER AND ACCELEROMETER MEASUREMENTS [SIMULATION DE LA RESTITUTION FINE D'UNE ORBITE BASSE. ANALYSE DE COVARIANCE DE LA POSITION-VITESSE PAR MESURES DOPPLER ET ACCELEROMETRIQUES]
Andre Areny and Jean-Luc Palmade 12 Jul. 1984 129 p refs In FRENCH
(CNES-CT/DTI/MS/AE/166) Avail: NTIS HC A07/MF A01

The nongravitational orbit perturbations such as atmospheric friction and radiation pressure were studied. Geopotential was modeled to the second order only. A SPOT satellite orbit is considered. The algorithm used to simulate the measurements is described. The computer programming is discussed. It is shown that the accelerometer measurement permits to improve the accuracy of the coefficients of the nongravitational acceleration at the expense of an increase in the covariance measurement error. Once the acceleration bias is adjusted, the overall precision gain using accelerometer and Doppler is as high as six at low accelerations. Author (ESA)

N85-26777# Joint Publications Research Service, Arlington, Va.
POSITIONS OF RELATIVE EQUILIBRIUM OF SATELLITE-GYROSTAT Abstract Only
V. A. Sarychev and S. A. Gutnik *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 6 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 323-326 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26780# Joint Publications Research Service, Arlington, Va.
STABILITY OF PERIODIC SATELLITE MOTIONS RELATIVE TO CENTER OF MASS IN CIRCULAR ORBIT Abstract Only
A. A. Saitbattalov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 8-9 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun 1984 p 341-351 Original language doc. was announced in IAA as A84-39504 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26793# Joint Publications Research Service, Arlington, Va.
ACCURACY IN PREDICTING ORBITAL MOTION OF ARTIFICIAL EARTH SATELLITE Abstract Only
K. V. Kholshevnikov, L. L. Sokolov, Ye. I. Timoshkova, and V. B. Titov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 18 Transl. into ENGLISH from Vestn. Leningrad. Univ.: Mat., Mekh., Astron. (Leningrad), no. 4, Oct. 1984 p 68-71 Original language doc. was announced in IAA as A85-21660 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27290*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OPTICAL BEST ARC RMS TEST RESULTS
Theodore L. Felsentreger *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 9 p (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 22A

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N85-26837# Materials Research Labs., Melbourne (Australia).
SPECTROSCOPIC STUDIES OF A RAILGUN MUZZLE FLASH
D. D. Richardson Feb. 1985 20 p refs
(MRL-R-952; AR-004-201) Avail: NTIS HC A02/MF A01

Spectra observed in the muzzle flash of a rail gun in the range 335 to 460 nm are presented and shown to be very complex. From identification of about 90 of the significant lines, a temperature of 30-35,000 K is estimated for the muzzle flash. From observations of Al lines, due to placement of Al plugs at varying distances from the muzzle, and the subsequent injection of atoms into the railgun plasma. It is shown that Al remains within the plasma for at least ten plasma lengths. The Al concentration tends to decrease as a quadratic function of distance. B.W.

N85-26838# Army Armament Research and Development Command, Dover, N. J. Large Caliber Weapon Systems Lab.
METAL ARMATURES FOR RAILGUNS Final Technical Report, 1982 - 1984
G. L. Ferrentino and W. J. Kolkert Mar. 1985 32 p
(AD-A152129; AD-E401303; ARLCD-TR-84030) Avail: NTIS HC A03/MF A01 CSCL 19/5

Proper design of a metal armature for a railgun projectile is vital to obtain optimal performance and to reduce rail wear. Previous armature designs did not include the contribution of friction to the heat of the rail-armature interface. A simplified model of the electromechanical heating of the armature was developed and used to redesign an armature for the EMACK railgun at the Armament Research and Development Center. A new integrated armature-sabot package was constructed and test-fired. GRA

N85-27811 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).
HELIOS GROUND OPERATIONS [HELIOS-BODENBETRIEB]
Joachim Kehr and Georg Hiendlmeier *In its* Ten Years of Helios 1984 p 183-188 In ENGLISH and GERMAN Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N85-26839# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ESTIMATION OF LAUNCH VEHICLE PERFORMANCE PARAMETERS M.S. Thesis
D. A. Vallado Dec. 1984 131 p
(AD-A151927; AFIT/GA/AA/84D-10) Avail: NTIS HC A07/MF A01 CSCL 12/1

The estimation of launch vehicle performance parameters

was explored through the use of a Bayes filter. The main emphasis was to use an eight state model that would include the vehicle position and velocity vectors, the vehicle exhaust velocity, and the ratio of the mass flow rate to the initial mass. A primary objective was to be able to observe these quantities through the staging events, where the last two elements of the state would be changing very rapidly. The results indicated that indeed the staging event was observable. However, as would be expected, the data processed at the exact time of staging included errors which diminished as the filter processed more data. A fading memory was added in an attempt to improve the filters performance in the area of the staging event. This proved to be marginally successful as several Bayes loop iterations had to be performed to notice the effect of the fading memory addition. Care was taken to show each step of the filter development and its checkout. Several numerical tables are presented including the input and output data. Author (GRA)

N85-26662# Kongsberg Vapenfabrikk A/S (Norway).
COST-EFFECTIVE MISSILE GUIDANCE THROUGH DISTRIBUTED ARCHITECTURE AND STANDARD PROCESSES
H. Gloerud *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 6 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26790# Joint Publications Research Service, Arlington, Va.
MODELING PLASMA MANTLE OF EARTH'S MAGNETOSPHERE Abstract Only
I. M. Podgornyy, Yu. N. Potanin, and I. A. Semenov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 16 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 16 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N85-26840*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ORBITER MIDDECK/PAYLOAD STANDARD INTERFACES CONTROL DOCUMENT
Mar. 1984 88 p
(NASA-TM-87473; ICD-2-1-M001; NAS 1.15:87473) Avail: NTIS HC A05/MF A01 CSCL 22B

The interfaces which shall be provided by the baseline shuttle mid-deck for payload use within the mid-deck area are defined, as well as all constraints which shall be observed by all the users of the defined interfaces. Commonality was established with respect to analytical approaches, analytical models, technical data and definitions for integrated analyses by all the interfacing parties. Any payload interfaces that are out of scope with the standard interfaces defined shall be defined in a Payload Unique Interface Control Document (ICD) for a given payload. Each Payload Unique ICD will have comparable paragraphs to this ICD and will have a corresponding notation of A, for applicable; N/A, for not applicable; N, for note added for explanation; and E, for exception. On any flight, the STS reserves the right to assign locations to both payloads mounted on an adapter plate(s) and payloads stored within standard lockers. Specific locations requests and/or requirements exceeding standard mid-deck payload requirements may result in a reduction in manifesting opportunities. Author

N85-26841*# Axiomatix, Los Angeles, Calif.
SPACE SHUTTLE PROGRAM COMMUNICATION AND TRACKING SYSTEMS INTERFACE ANALYSIS Final Report
James G. Dodds, Jack K. Holmes, Gaylord K. Huth, Richard S. Iwasaki, Peter W. Nilsen, Andreas Polydoros, d Raimundo Sampaio, and Sergei Udalov Sep. 1984 365 p refs
(Contract NAS9-16893)
(NASA-CR-171862; NAS 1.26:171862; Axiomatrix-8409-2) Avail: NTIS HC A16/MF A01 CSCL 22B

The Space Shuttle Program Communications and Tracking Systems Interface Analysis began April 18, 1983. During this time, the shuttle communication and tracking systems began flight testing. Two areas of analysis documented were a result of observations made during flight tests. These analyses involved the Ku-band communication system. First, there was a detailed analysis of the interface between the solar max data format and the Ku-band communication system including the TDRSS ground station. The second analysis involving the Ku-band communication system was an analysis of the frequency lock loop of the Gunn oscillator used to generate the transmit frequency. The stability of the frequency lock loop was investigated and changes to the design were reviewed to alleviate the potential loss of data due the loop losing lock and entering the reacquisition mode. Other areas of investigation were the S-band antenna analysis and RF coverage analysis. G.L.C.

N85-26842*# Hoffman (F. E.) and Associates, Montrose, Calif.
COST PREDICTION MODEL FOR VARIOUS PAYLOADS AND INSTRUMENTS FOR THE SPACE SHUTTLE ORBITER Final Report
F. E. Hoffman 17 Aug. 1984 36 p refs Prepared for JPL
(Contract NAS7-918)
(NASA-CR-175781; JPL-9950-1061; NAS 1.26:175781; FEHA-84-08-01) Avail: NTIS HC A03/MF A01 CSCL 22B

The following cost parameters of the space shuttle were undertaken: (1) to develop a cost prediction model for various payload classes of instruments and experiments for the Space Shuttle Orbiter; and (2) to show the implications of various payload classes on the cost of: reliability analysis, quality assurance, environmental design requirements, documentation, parts selection, and other reliability enhancing activities. G.L.C.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N85-26843# Centre National d'Etudes Spatiales, Toulouse (France).
DORIS: PREDICTION IN DOPPLER MEASUREMENT [DORIS: PREDICTION DE LA MESURE DOPPLER]
S. Daillet 25 Jul. 1984 95 p refs In FRENCH
(CNES-CT/DTI/MS/AE/170) Avail: NTIS HC A05/MF A01

Studies to improve the Doppler measurement of satellite orbital parameters are presented. The prediction errors induced by the imperfections of the extrapolation model are evaluated. The minimization of the number of coefficients in the parameterization of a Doppler curve by an arctan function is proposed. The modeling of a Doppler curve by time-shift and selection of a reference curve is suggested. In the case of SPOT satellite a 800 km zenith passage is adopted. A minimization of the onboard computations is obtained by Doppler positioning by extrapolation of orbital parameters received regularly. Author (ESA)

N85-26783# Joint Publications Research Service, Arlington, Va.
METHOD FOR EVALUATING PERTURBATION IN ALGORITHMS FOR SOLVING NAVIGATIONAL PROBLEMS Abstract Only
A. A. Chernov and V. D. Yastrebov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 11 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 361-368 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26784# Joint Publications Research Service, Arlington, Va.
STATISTICAL REGULARIZATION METHODS IN PROBLEM OF NAVIGATIONAL DETERMINATION OF SPACE VEHICLE ORBITS Abstract Only
A. V. Makshanov, A. A. Musayev, and O. M. Stepanyuk *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 11-12 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 468-471 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26785# Joint Publications Research Service, Arlington, Va.
OBSERVABILITY IN PROBLEM OF CORRECTION OF INERTIAL NAVIGATION SYSTEMS USING ADDITIONAL INFORMATION FROM ARTIFICIAL EARTH SATELLITE Abstract Only
V. I. Kalenova and V. M. Morozov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 12 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 390-398 Original language doc. was announced in IAA as A84-39509 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27337# Thorn EMI, Hayes (England). Sheer Water Working Dept.
DB2 AND DB3: THE NEXT GENERATION
P. A. Bedford *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 6 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

N85-27345# Institute of Oceanographic Sciences, Wormley (England).
RESULTS OF AN INITIAL TRIAL OF A SATELLITE TELEMETERING BUOY MEASURING NEAR SURFACE CURRENT
P. G. Collar and C. A. Hunter *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 8 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N85-26844*# Rockwell International Corp., Seal Beach, Calif. Satellite Systems Div.
A STUDY OF SPACERAFT TECHNOLOGY AND DESIGN CONCEPTS, VOLUME 1 Final Report
F. A. Zylius 5 Mar. 1985 218 p 2 Vol.
(Contract NAS1-17758)
(NASA-CR-172579-Vol-1; NAS 1.26:172579-Vol-1; SSD-85-0012-3-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 22B

Concepts for advancing the state of the art in the design of unmanned spacecraft, the requirements that gave rise to its configuration, and the programs of technology that are suggested as leading to its eventual development are examined. Particular technology issues discussed include: structures and materials; thermal control; propulsion; electrical power; communications; data management; and guidance, navigation, and control. A.R.H.

N85-26845*# Rockwell International Corp., Seal Beach, Calif. Satellite Systems Div.
A STUDY OF SPACECRAFT TECHNOLOGY AND DESIGN CONCEPTS. VOLUME 2: APPENDICES Final Report
F. A. Zylius 5 Mar. 1985 133 p 2 Vol.
(Contract NAS1-17758)
(NASA-CR-172579-Vol-2; NAS 1.26:172579-Vol-2; SSD-85-0013-3-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 22B

Electrical, mechanical, and software subsystem needs in the Post 1990 space operations environment are considered as well as the effect of radiation environment on spacecraft configuration. Criteria are given for selecting a specific design or technology concept from among the alternatives available. A.R.H.

N85-26846*# National Aeronautics and Space Administration, Washington, D. C.
THE NASA SPACE STATION PROGRAM PLANS
Robert F. Freitag Oct. 1984 12 p Presented at the 5th DGLR/A.A.S./AIAA Symp., Hamburg, 3-5 Oct. 1984
(NASA-TM-87474; NAS 1.15:87474) Avail: NTIS HC A02/MF A01 CSCL 22B

The design of a permanently manned space station is discussed. The role of the space shuttle, planning guidelines, international cooperation, and commercial possibilities are among the topics discussed. R.J.F.

N85-26847*# National Aeronautics and Space Administration, Washington, D. C.
SPACESTATION: THE NEXT LOGICAL STEP
1985 55 p Original contains color illustrations
(NASA-EP-213; NAS 1.19:213) Avail: NTIS MF A01; SOD HC CSCL 22B

The concept of a U.S. space station is discussed. The design, how it will work, space laboratory functions, commerce in space, and international cooperation are discussed. R.J.F.

N85-26848*# Astro Research Corp., Carpinteria, Calif.
A STUDY OF STRUCTURAL CONCEPTS FOR ULTRALIGHTWEIGHT SPACECRAFT Final Report
Richard K. Miller, Karl Knapp, and John M. Hedgepeth 16 Apr. 1984 90 p ref Sponsored by NASA Prepared for JPL
(NASA-CR-175765; JPL-9950-1064; NAS 1.26:175765; ARC-TN-1127) Avail: NTIS HC A05/MF A01 CSCL 22B

Structural concepts for ultralightweight spacecraft were studied. Concepts for ultralightweight space structures were identified and the validity of heir potential application in advanced spacecraft was assessed. The following topics were investigated: (1) membrane wrinkling under pretensioning; (2) load-carrying capability of pressurized tubes; (3) equilibrium of a precompressed rim; (4) design of an inflated reflector spacecraft; (5) general instability of a rim; and (6) structural analysis of a pressurized isotensoid column. The design approaches for a paraboloidal reflector spacecraft included a spin-stiffened design, both inflated and truss central columns, and to include both deep truss and rim-stiffened geodesic designs. The spinning spacecraft analysis is included, and the two truss designs are covered. The performances of four different approaches to the structural design of a paraboloidal reflector spacecraft are compared. The spinning and inflated configurations result in very low total masses and some concerns about their performance due to unresolved questions about dynamic stability and lifetimes, respectively. E.A.K.

N85-26849*# Ford Aerospace and Communications Corp., Palo Alto, Calif.
SPACECRAFT CONFIGURATION STUDY FOR SECOND GENERATION MOBILE SATELLITE SYSTEM Final Report
M. Louie, W. vonStentzsch, F. Zanella, R. Hayes, F. McGovern, and R. Tyner Jan. 1985 111 p refs
(Contract JPL-956904)
(NASA-CR-175774; JPL-9950-1086; NAS 1.26:175774) Avail: NTIS HC A06/MF A01 CSCL 22B

A high power, high performance communicatons satellite bus being developed is designed to satisfy a broad range of multimission payload requirements in a cost effective manner and is compatible with both STS and expendable launchers. Results are presented of tradeoff studies conducted to optimize the second generation mobile satellite system for its mass, power, and physical size. Investigations of the 20-meter antenna configuration, transponder linearization techniques, needed spacecraft modifications, and

spacecraft power, dissipation, mass, and physical size indicate that the advanced spacecraft bus is capable of supporting the required payload for the satellite. A.R.H.

N85-26850*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
IDENTIFICATION AND CONTROL OF STRUCTURES IN SPACE Progress Report, 1 Jul. - 31 Dec. 1984
Leonard Meirovitch, Roger D. Quinn, and Mark A. Norris 1984 18 p ref
(Grant NAG1-225)
(NASA-CR-175790; NAS 1.26:175790) Avail: NTIS HC A02/MF A01 CSCL 22B

The derivation of the equations of motion for the Spacecraft Control Laboratory Experiment (SCOLE) is reported and the equations of motion of a similar structure orbiting the earth are also derived. The structure is assumed to undergo large rigid-body maneuvers and small elastic deformations. A perturbation approach is proposed whereby the quantities defining the rigid-body maneuver are assumed to be relatively large, with the elastic deformations and deviations from the rigid-body maneuver being relatively small. The perturbation equations have the form of linear equations with time-dependent coefficients. An active control technique can then be formulated to permit maneuvering of the spacecraft and simultaneously suppressing the elastic vibration. E.A.K.

N85-26851*# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Space Station Engineering and Technology Development.
SPACE STATION ENGINEERING AND TECHNOLOGY DEVELOPMENT
1985 136 p refs Presented at Panel on Maintainability, Huntsville, Ala., 20-21 Mar. 1985
(Contract NASw-4003)
(NASA-CR-175806; NAS 1.26:175806) Avail: NTIS HC A07/MF A01 CSCL 22B

The evolving space station program will be examined through a series of more specific studies: maintainability; research and technology in space; solar thermodynamics research and technology; program performance; onboard command and control; and research and technology road maps. The purpose is to provide comments on approaches to long-term, reliable operation at low cost in terms of funds and crew time. B.G.

N85-26852*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPACE STATION SPARTAN STUDY Final Report
John H. Lane, Joseph R. Schulman, and Werner M. Neupert May 1985 183 p
(NASA-TM-86215; Rept-85F0220; NAS 1.15:86215) Avail: NTIS HC A09/MF A01 CSCL 22B

The required extension, enhancement, and upgrading of the present Spartan concept are described to conduct operations from the space station using the station's unique facilities and operational features. The space station Spartan (3S), the free flyer will be deployed from and returned to the space station and will conduct scientific missions of much longer duration than possible with the current Spartan. The potential benefits of a space station Spartan are enumerated. The objectives of the study are: (1) to develop a credible concept for a space station Spartan; and (2) to determine the associated requirements and interfaces with the space station to help ensure that the 3S can be properly accommodated. E.A.K.

N85-26853*# University of Central Florida, Orlando. Dept. of Computer Engineering.
A SLAM II SIMULATION MODEL FOR ANALYZING SPACE STATION MISSION PROCESSING REQUIREMENTS Final Report
Darrell G. Linton 11 May 1985 112 p
(Grant NAG10-13)
(NASA-CR-175664; NAS 1.26:175664) Avail: NTIS HC A06/MF A01 CSCL 22B

Space station mission processing is modeled via the SLAM 2 simulation language on an IBM 4381 mainframe and an IBM PC microcomputer with 620K RAM, two double-sided disk drives and an 8087 coprocessor chip. Using a time phased mission (payload) schedule and parameters associated with the mission, orbiter (space shuttle) and ground facility databases, estimates for ground facility utilization are computed. Simulation output associated with the science and applications database is used to assess alternative mission schedules. Author

N85-26854*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
THE INVESTIGATION OF TETHERED SATELLITE SYSTEM DYNAMICS Quarterly Report, 15 Feb. - 14 May 1985
Enrico Lorenzini Jun. 1985 57 p
(Contract NAS8-36160)
(NASA-CR-175855; NAS 1.26:175855; QR-3) Avail: NTIS HC A04/MF A01 CSCL 22B

The tether control law to retrieve the satellite was modified in order to have a smooth retrieval trajectory of the satellite that minimizes the thruster activation. The satellite thrusters were added to the rotational dynamics computer code and a preliminary control logic was implemented to simulate them during the retrieval maneuver. The high resolution computer code for modelling the three dimensional dynamics of untensioned tether, SLACK3, was made fully operative and a set of computer simulations of possible tether breakages was run. The distribution of the electric field around an electrodynamic tether in vacuo severed at some length from the shuttle was computed with a three dimensional electrodynamic computer code. Author

N85-26855# Committee on Commerce, Science, and Transportation (U. S. Senate).
RECENT FAILURES OF WEATHER SATELLITES
Washington GPO 1984 34 p Hearing before the Subcomm. on Sci., Technol., and Space of the Comm. on Com., Sci., and Transportation, 98th Congr., 2nd Sess., 2 Aug. 1984
(S-Hrg-98-1070; GPO-38-684) Avail: Subcommittee on Science, Technology, and Space

The effect of the failures of the GOES-East and the NOAA-8 satellites on the ability to forecast weather conditions, especially hurricane warnings is examined. Interim coverage, and long term system improvement were also discussed. B.G.

N85-26856# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PROPOSED ENERGY SYSTEMS FOR THE BRAZILIAN DATA COLLECTION SATELLITE
L. J. Faria, R. D. Costa, J. P. Andrade-Filho, C. R. E. R. Duenas, F. C. deNadai, C. J. C. Barros, G. J. Adabo, N. M. Tanaka, C. R. G. Morais, A. Francisco, Jr. et al Jan. 1985 13 p refs Presented at the 4th Nipo-Brasil. Symp. of Sci. and Technol., Sao Jose dos Campos, Brazil, 4-6 Aug. 1984
(INPE-3393-PRE/664) Avail: NTIS HC A02/MF A01

The first satlite of the Brazilian Complete Space Mission will be devoted o Data Collection. Twelve specialists engaged in its energy program have proposed an architecture for the power supply subsystem. Based on a fixed body mounted solar array generator, it has a dual Ni-Cd battery for energy storage and has its bus voltage limited by a shunt regulator. The power is distributed to other subsystems by multiple DC/DC switching converters and a relay based switching unit. All these parts have been developed and are being tested functionally at a prototype level. Author

N85-26857# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MODEL REDUCTION TECHNIQUES APPLIED TO THE CONTROL OF LARGE SPACE STRUCTURES M.S. Thesis
D. W. Varhola Dec. 1984 126 p
(AD-A151784; AFIT/GA/AA/84D-11) Avail: NTIS HC A07/MF A01 CSCL 14/2

Three model reduction techniques were examined for their

applicability to large lightly damped systems. Frequency truncation, modal cost analysis, and approximate internal balancing methods are applied to the CSDL I and II models. Two actuator/sensor configurations are investigated on the CSDL I. Control of the CSDL I model is implemented through the use of the steady state optimal regulator theory, and the effect of various reduced order control models on the structure's time response is detailed. Modal cost analysis and internal balancing yield is essentially equivalent results for the cases chosen, although the internal balancing technique provides more information concerning actuator/sensor effectiveness. These methods provide more effective reduced order models for higher order systems than simple frequency truncation. GRA

N85-26858# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE EFFECT OF INACCURACIES IN STRUCTURAL MODELS ON THE CONTROL OF LARGE SPACE STRUCTURES M.S. Thesis
S. E. Moore Dec. 1984 110 p
(AD-A151794; AFIT/GA/AA/84D-6) Avail: NTIS HC A06/MF A01 CSCL 12/1

Modern optimal control methods are proposed as a method for controlling the vibration of large space structures. These methods are very dependent on the structural finite element model as a basis for calculating the optimal control. This research investigates the effect of inaccuracies of these structural models on the performance of this type of controller. Any finite element model is a discretization of the actual structure. As such, it is impossible to exactly model the structure because the model is finite and discrete while the structure is continuous. These errors plus those due to inaccurate assumptions or measurements create discrepancies between what the structure is and what the controller is actually designed for. The structural model is used to calculate a number (equal to the number of degrees of freedom) of natural vibration frequencies with their associated mode shapes. These vibration modes can be grouped into four sets; controlled, suppressed, residual and unmodeled. The structural model used for this research is the Charles Stark Draper Laboratory Model 1 (CSDL1). It is a tetrahedral truss with four lumped masses yielding twelve degrees of freedom, and hence, twelve vibratory modes. GRA

N85-26859# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
OPTIMAL OPEN LOOP AND NONLINEAR FEEDBACK CONTROL FOR REMOTE ORBITAL CAPTURE Ph.D. Thesis
J. W. Widhalm, Jr. 1985 113 p
(AD-A151967; AFIT/CI/NR-85-32D) Avail: NTIS HC A06/MF A01 CSCL 22/1

In this thesis optimal open loop aand nonlinear feedback control histories are presented for a problem of detumbling (passivating) a target satellite by a remotely operated robot spacecraft. Detumbling is required so that the robot spacecraft, sometimes called a teleoperator or orbital maneuvering vehicle (OMV), can return the target satellite to low-Earth orbit for servicing and repair. The dynamics of the coupled two-body system are described with equations of motion derived from an Eulerian formulation (the Hooker-Margulies equations). Two degrees of rotational freedom are allowed at the joint which connects the OMV and target spacecraft, and the joint is allowed to translate on the surface of the OMV. The initial condition of the axially symmetric target satellite is free spin and precession. Representative masses and inertias are assumed for each body. The detumbling controls, which are the external (thruster) and internal (joint) torques applied by the OMV, are found from optimal control theory yields a nonsingular two-point-boundary-value-problem which is solved numerically for the open loop controls over a specified time internal. Control constraints on the thrusters and one of the joint torques are also considered. Liapunov stability theory is used to derive a nonlinear feedback control which results in the asympototic stability of a set of equilibria for the two-body system. This control law is analyzed numerically and compared to the results of optimum open loop control. GRA

N85-26860# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ANALYSIS OF ORBIT TRANSFER VEHICLES FOR GPS BLOCK 3 SATELLITES M.S. Thesis
D. P. Boyarski and S. P. Mahoney Dec. 1984 194 p
(AD-A152021; AFIT/GSO/OS/84D-2) Avail: NTIS HC A09/MF A01 CSCL 22/3

The overall objective of this research was to determine the feasibility and the cost optimum system for using electric OTVs to move Block 3 GPS satellites from LEO to a 10,900 nm orbit. For the EOTV, the propulsion systems considered were present and 1990's technology ion engines using mercury, xenon or argon for a propellant. There were two power sources evaluated, a 100 KW nuclear reactor and solar arrays. A systems cost model which combines payload, power source, trajectory, and earth-to-LEO launch parameters with algorithms characterizing the electric propulsion system was used. The goal was to find the least costly systems which had a triptime equal to or less than 90 days. These systems were than compared with the PAM D-II, CENTAUR-G, and IUS in terms of total deployment costs for 28 GPS satellites launched at a rate of four per year for seven years. The studies found that a reusable EOTV with 12 mercury ion engines powered by gallium arsenide concentrator arrays could perform the mission for 42% of the cost of the cheapest chemical system. The nuclear powered EOTV, while less costly than the chemical systems, was not as competitive as the solar EOTV. The weight of the nuclear reactor and its heat radiators required the use of 37 engines resulting in higher costs for the system. GRA

N85-26654# Marconi Avionics Ltd., Rochester (England). Airport Works.
THE IMPACT OF VLSI ON GUIDANCE AND CONTROL SYSTEM DESIGN
Don Price *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 4 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-27287*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE PHYSICAL AND ORBITAL CHARACTERISTICS
S. M. Klosko *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 17 refs (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 22B

N85-27288*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE SELECTION CRITERIA
S. M. Klosko, F. J. Lerch, C. A. Wagner, and O. L. Colombo *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 9 p (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 22B

N85-27733 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
STATION FOR IN-ORBIT TESTING OF SATELLITES [TESTSTATION FUER SATELLITEN IM ORBIT]
Gerhard Ulrich *In its* Res. and Develop. Sci. and Tech. Repts. 1984 1984 p 237-244 refs In GERMAN (For primary document see N85-27724 16-81)
(MBB-UR-708/84-O) Avail: Issuing Activity

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

N85-26861*# Sperry Corp., Phoenix, Ariz. Space Systems Div.
IMPACT OF MAGNETIC ISOLATION ON POINTING SYSTEM PERFORMANCE IN THE PRESENCE OF STRUCTURAL FLEXI-

BILITY
J. Seller Feb. 1985 69 p refs
(Contract NAS1-:616909)
(NASA-CR-172481; NAS 1.26:172481) Avail: NTIS HC A04/MF A01 CSCL 14B

The inertial pointing stability of a gimbal pointing system (AGS) was compared with a magnetic pointing/gimbal followup system (ASPS), under certain conditions of system structural flexibility and disturbance inputs from the gimbal support structure. Separate 3 degree-of-freedom (3DOF) linear models based on NASTRAN modal flexibility data for the gimbal and support structures were generated for the ASPS configurations. Using the models inertial pointing control loops providing 6dB of gain margin and 45 deg of phase margin were defined for each configuration. The pointing loop bandwidth obtained for the ASPS is more than twice the level achieved for the AGS configuration. The AGS limit is attributed to the gimbal and support structure flexibility. As a result of the higher ASPS pointing loop bandwidth and the disturbance rejection provided by the magnetic isolation ASPS pointing performane is significantly better than that of the AGS system. The low frequency peak of the ASPS transfer function from base disturbance to payload angular motion is almost 60dB lower than AGS low frequency peak. E.A.K.

N85-26782# Joint Publications Research Service, Arlington, Va.
OPTIMUM PARAMETERS OF AEROGYROSCOPIC SATELLITE ORIENTATION SYSTEM Abstract Only
V. A. Sarychev, S. A. Mirer, and V. A. Zlatoustov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 10-11 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 369-380 Original language doc. was announced in IAA as A84-39507 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N85-26862*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ADVANCED HIGH PRESSURE O2/H2 TECHNOLOGY
S. F. Morea, ed. and S. T. Wu, ed. (Alabama Univ., Huntsville) Washington Apr. 1985 753 p refs Conf. held in Huntsville, Ala., 27-29 Jun. 1984
(NASA-CP-2372; NAS 1.55:2372) Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

Activities in the development of advanced high pressure oxygen-hydrogen stage combustion rocket engines are reported. Particular emphasis is given to the Space Shuttle main engine. The areas of engine technology discussed include fracture and fatigue in engine components, manufacturing and producibility engineering, materials, bearing technology, structure dynamics, fluid dynamics, and instrumentation technology. For individual titles, see N85-26863 through N85-26911.

N85-26863*# Failure Analysis Associates, Palo Alto, Calif.
A REVIEW OF FRACTURE MECHANICS LIFE TECHNOLOGY **c39**
Jerrell M. Thomas, P. M. Besuner, and D. O. Harris *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 5-19 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

Current lifetime prediction technology for structural components subjected to cyclic loads was reviewed. The central objectives of the project were to report the current state of and recommend future development of fracture mechanics-based analytical tools for modeling and forecasting subcritical fatigue crack growth in structures. Of special interest to NASA was the ability to apply these tools to practical engineering problems and the developmental steps necessary to bring vital technologies to this stage. A survey of published literature and numerous discussions with experts in the field of fracture mechanics life technology were conducted. One of the key points made is that fracture mechanics analyses of crack growth often involve consideration of fatigue and fracture under extreme conditions. Therefore, inaccuracies in predicting component lifetime will be dominated by inaccuracies in environment and fatigue crack growth relations, stress intensity factor solutions, and methods used to model given loads and stresses. Suggestions made for reducing these inaccuracies include: development of improved models of subcritical crack growth, research efforts aimed at better characterizing residual and assembly stresses that can be introduced during fabrication, and more widespread and uniform use of the best existing methods. M.G.

N85-26864*# Rocketdyne, Canoga Park, Calif.
FATIGUE LIFE EXTENSION **c38**
D. E. Matejczyk and J. Lin *In* NASA. Marshall Space Flight Center. Advan. High Pressure O2/H2 Technol. Apr. 1985 p 20-35 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14D

Potential fatigue rejuvenation processes were carried out on fatigue-damaged material both with and without observable surface-connected fatigue cracks. The fatigue life of fatigue-damaged MAR-M246(Hf)(DS), a directionally solidified nickel-base superalloy used in turbine airfoils, was extended by reheat treatment. The fatigue life of fatigue-cracked Inconel 718, a wrought nickel-base superalloy used in a wide variety of advanced rocket engine components, was extended by electron-beam welding to close off the surface-connected crack, followed by hot isostatic pressing and reheat treatment. M.G.

N85-26865*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THRUST CHAMBER LIFE PREDICTION **c38**
Harold J. Kasper *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 36-43 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14D

The reusable life of the Space Shuttle main engine (SSME) is influenced by the cyclic life of the regeneratively liquid cooled main combustion chamber (MCC). During an operational duty cycle the MCC liner is subjected to a large transient thermal gradient that imparts a high thermal cyclic strain to the liner hot gas wall. Life predictions of such chambers have usually been based on low cycle fatigue (LCF) evaluations. Hot-fire testing, however, has shown significant mid-channel wall deformation and thinning during accrued cyclic testing. This phenomenon is termed cyclic creep and appears to be significantly accelerated at elevated temperatures. An analytical method that models the cyclic creep phenomenon and its application to thrust chamber life prediction is presented. The chamber finite element geometry is updated periodically to account for accrued wall thinning and distortion. Failure is based on the tensile instability failure criterion. Cyclic life results for several chamber life enhancing coolant channel designs are compared to the typically used LCF analysis that neglects cyclic creep. The results show that the usable cyclic creep life is approximately 30 to 50% of the commonly used LCF life. Author

N85-26866*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MANUFACTURING AND PRODUCIBILITY TECHNOLOGY
James D. Hankins and Robert L. Dreshfield (NASA. Lewis Research Center) *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 44-48 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

Activities of the manufacturing/producibility working group

within the Advanced High-Pressure O2/H2 Technology Program are summarized. The objectives of the M/P working group are: to develop and evaluate process and manufacturing techniques for advanced propulsion hardware design and selected materials; and to optimize the producibility of (SSME) components and assemblies by improved performance, increased life, greater reliability, and/or reduced cost. The technologies being developed include: plasma arc, laser, and inertia welding; combustion chamber and turbine blade coatings; coating processes; high performance alloy electroforming; and process control technology. M.G.

N85-26867*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ROCKET THRUST CHAMBER THERMAL BARRIER COATINGS c27

Richard J. Quentmeyer *In* NASA. Marshall Space Flight Center. Advan. High Pressure O2/H2 Apr. 1985 p 49-58 (For primary document see N85-26862 16-20)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 11B

Subscale rocket thrust chamber tests were conducted to evaluate the effectiveness and durability of thin yttria stabilized zirconium oxide coatings applied to the thrust chamber hot-gas side wall. The fabrication consisted of arc plasma spraying the ceramic coating and bond coat onto a mandrell and then electrodepositing the copper thrust chamber wall around the coating. Chambers were fabricated with coatings .008, and .005 and .003 inches thick. The chambers were thermally cycled at a chamber pressure of 600 psia using oxygen-hydrogen as propellants and liquid hydrogen as the coolant. The thicker coatings tended to delaminate, early in the cyclic testing, down to a uniform sublayer which remained well adhered during the remaining cycles. Two chambers with .003 inch coatings were subjected to 1500 thermal cycles with no coating loss in the throat region, which represents a tenfold increase in life over identical chambers having no coatings. An analysis is presented which shows that the heat lost to the coolant due to the coating, in a rocket thrust chamber design having a coating only in the throat region, can be recovered by adding only one inch to the combustion chamber length. M.G.

N85-26868*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.

CERAMICS FOR ADVANCED O2/H2 APPLICATION c27

H. W. Carpenter *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 59-73 refs (For primary document see N85-26862 16-20)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 11B

Ceramics are prime candidate materials for advanced rocket engines because they possess high-temperature capability, a tolerance for aggressive environments, and low density. A program was conducted to assess the applicability of structural ceramics to advanced versions of the Space Shuttle main engine (SSME). Operating conditions of ceramic turbine components were defined and each component in the hot-gas path was assessed in regard to materials selection, manufacturing process and feasibility, and relative structural reliability. The conclusion is that ceramic components would be viable in advanced SSME turbopumps. Author

N85-26869*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

VACUUM PLASMA COATINGS FOR TURBINE BLADES c27

Richard R. Holmes *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 74-90 refs (For primary document see N85-26862 16-20)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 11G

Turbine blades, vacuum plasma spray coated with NiCrAlY, CoCrAlY or NiCrAlY/Cr2O3, were evaluated and rated superior to standard space shuttle main engine (SSME) coated blades. Ratings were based primarily on 25 thermal cycles in the MSFC Burner Rig Tester, cycling between 1700 F (gaseous H2) and -423 F (liquid H2). These tests showed no spalling on blades with improved vacuum plasma coatings, while standard blades spalled. Thermal barrier coatings of ZrO2, while superior to standard coatings, lacked the overall performance desired. Fatigue and tensile specimens, machined from MAR-M-246(Hf) test bars identical to the blades were vacuum plasma spray coated, diffusion bond treated, and tested to qualify the vacuum plasma spray process for flight hardware testing and application. While NiCrAlY/Cr2O3 offers significant improvement over standard coatings in durability and thermal protection, studies continue with an objective to develop coatings offering even greater improvements. M.G.

N85-26870*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

MATERIAL TECHNOLOGY Abstract Only c23

Robert L. Dreshfield (NASA. Lewis Research Center) and W. B. McPherson *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 91-92 (For primary document see N85-26862 16-20)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 11G

Advanced high pressure O2/H2 propulsion systems as exemplified by the Space Shuttle Main Engine (SSME) create challenging operating environments for materials. Many components operate in either hydrogen or hydrogen-steam environments which may significantly degrade the performance of common alloys. The objective of the materials technology projects is to develop and evaluate candidate materials for application in advanced high pressure O2/H2 propulsion systems. These new and improved materials are to improve the durability or performance of the SSME or derivative engine. The program includes projects on the following topics: (1) Hydrogen Resistant Alloys; (2) High Pressure O2 Ignition and Burning; (3) Improved Turbine Blades; (4) Improved Turbine Disk Material; (5) Impact Reactivity in High Pressure O2; and Fiber Reinforced Superalloys. Author

N85-26871*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.

DESIGN OVERVIEW OF FIBER-REINFORCED SUPERALLOY COMPOSITES FOR THE SPACE SHUTTLE MAIN ENGINE c24

J. R. Lewis *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 93-109 refs (For primary document see N85-26862 16-20)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 11D

This preliminary design study evaluated the potential of fiber-reinforced superalloys (FRS) for hot-section components of Space Shuttle Main Engine turbopumps. Emphasis was placed on uncooled turbine blades, with a more limited evaluation of FRS turbine stator vanes. The study included FRS properties evaluation, current structural design capability, and preliminary design and structural analysis. In addition, key technology needs were identified, and a plan was generated to develop operational hardware for advanced versions of the SSME. Based on projections of design properties for FRS composites comprising 50 volume percent of W-4Re-0.38Hf-0.02C wire filaments in a ductile superalloy matrix, it was concluded that FRS turbine blades offer the potential of significant improved operating life and higher temperature capability over the MAR-M-246(Hf) (DS) blades currently used in the SSME. B.W

N85-26872*# Rocketdyne, Canoga Park, Calif. Materials Engineering and Technology.

MATERIALS FOR ADVANCED ROCKET ENGINE TURBOPUMP TURBINE BLADES c26

W. T. Chandler *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 110-132 refs (For primary document see N85-26862 16-20)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 11F

A study program was conducted to identify those materials that will provide the greatest benefits as turbine blades for advanced liquid propellant rocket engine turbines and to prepare technology plans for the development of those materials for use in the 1990 through 1995 period. The candidate materials were selected from six classes of materials: single-crystal (SC) superalloys, oxide dispersion-strengthened (ODS) superalloys, rapid solidification processed (RSP) superalloys, directionally solidified eutectic (DSE) superalloys, fiber-reinforced superalloy (FRS)

composites, and ceramics. Properties of materials from the six classes were compiled and evaluated and property improvements were projected approximately 5 years into the future for advanced versions of materials in each of the six classes. B.W.

N85-26873*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DEVELOPMENT OF HYDROGEN RESISTANT ALLOYS Abstract Only **c26**
W. B. McPherson *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 133 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11F

The most hostile operating environments in the O2/H2 Space Shuttle Main Engine are gaseous hydrogen and hydrogen/water vapor. After years of evaluating commercially available alloys, only a few high strength alloys have been found that perform satisfactorily in these environments. This paper describes the evaluation of various compositions of the Fe-Ni-Co system with elemental additions of Cr, Cb, Ti and Al. After processing, notched tensile specimens were tested in 5000 psi hydrogen at room temperature as the prime screening test. The H2/air ratio was used as the selection/rejection criteria. Author

N85-26874*# National Bureau of Standards, Boulder, Colo. Chemical Engineering Science Div.
IGNITION OF METALS IN HIGH PRESSURE OXYGEN **c26**
James W. Bransford *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 134-148 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11F

A description of an experimental facility used to determine the ignition and combustion characteristics of metallic materials is given. The results obtained for aluminum 6061, 302 stainless steel, and the nickel alloy - N06625 are presented. Author

N85-26875*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
HIGH-PRESSURE HYDROGEN TESTING OF SINGLE CRYSTAL SUPERALLOYS FOR ADVANCED ROCKET ENGINE TURBOPUMP TURBINE BLADES **c26**
Richard A. Parr, Wendy S. Alter, Mary H. Johnston, and Joseph P. Strizak (ORNL) *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 150-163 refs Previously announced as N84-33563 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC

A screening program to determine the effects of high pressure hydrogen on selected candidate materials for advanced single crystal turbine blade applications is examined. The alloys chosen for the investigation are CM SX-2, CM SX-4C, Rene N-4, and PWA1480. Testing is carried out in hydrogen and helium at 34 MPa and room temperature, with both notched and unnotched single crystal specimens. Results show a significant variation in susceptibility to Hydrogen Environment Embrittlement (HEE) among the four alloys and a marked difference in fracture topography between hydrogen and helium environment specimens.
M.A.C. (IAA)

N85-26876*# Alabama Univ., Birmingham. Dept. of Materials Engineering.
RELATIONSHIPS BETWEEN MICROSTRUCTURE AND MICROFISSURING IN ALLOY 718 **c26**
R. G. Thompson *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 164-179 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11F

Microfissures which occur in the weld heat affected zone of alloy 718 can be a limiting factor in the material's weldability. Several studies have attempted to relate microfissuring susceptibility to processing conditions, microstructure, and/or heat-to-heat chemistry differences. The present investigation studies the relationships between microstructure and microfissuring by isolating a particular microstructural feature and measuring microfissuring as a function of that feature. Results to date include the identification of a microstructure-microfissure sequence, microfissuring susceptibility as a function of grain size, and microfissuring susceptibility as a function of solution annealing time. B.W.

N85-26877*# SKF Industries, Inc., King of Prussia, Pa.
DEVELOPMENT OF NEW MATERIALS FOR TURBOPUMP BEARINGS **c37**
Robert E. Maurer and Robert A. Pallini *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 180-200 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

The life requirement for the angular contact ball bearings in the Space Shuttle Main Engine (SSME) high pressure oxygen turbopump (HPOTP) is 7.5 hours. In actual operation, significantly shorter service life was experienced. The objective is to identify bearing materials and/or materials processing techniques offering signficant potential for extending HPOTP bearing performance life. Interactive thermomechanical analysis of the HPOTP bearing-shaft system was performed with the SHABERTH computer program. Bearing fatigue life, ball-race contact stress, heat generation rate, bulk ring temperatures and circumferential stress in the inner rings were quantified as functions of radial load, thrust load and ball-race contact friction. Criteria established from the output of this analysis are being used for material candidate selection. Author

N85-26878*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
BEARINGS WORKING GROUP **c37**
In its Advan. High Pressure O2/H2 Technol. Apr. 1985 p 201-204 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

The service life of the Space Shuttle Main Engine (SSME) turbomachinery bearings was a predominant factor in engine durability and maintenance problems. Recent data has indicated that bearing life is about one order of magnitude lower than the goal of seven and one-half hours particularly those in the High Pressure Oxidizer Turbopump (HPOTP). Bearing technology, primarily cryogenic turbomachinery bearing technology, is expanded by exploring the life and performance effects of design changes; design concept changes; materials changes; manufacturing technique changes; and lubrication system changes. Each variation is assessed against the current bearing design in full scale cryogenic tests. B.G.

N85-26879*# Spectra Research Systems, Inc., Huntsville, Ala. Aerospace Systems and Products Div.
ADVANCED ROCKET ENGINE CRYOGENIC TURBOPUMP BEARING THERMAL MODEL **c37**
Joe C. Cody, Linda New, and Bruce Tiller *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 205-219 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

A lumped node thermal model was developed representing the Space Shuttle Main Engine (SSME) liquid oxygen (LOX) turbopump turbine end bearings operating in a cryogenically cooled bearing tester. Bearing elements, shaft, carrier, housing, cryogen flow characteristics, friction heat, and fluid viscous energy are included in the model. Heat transfer characteristics for the regimes of forced convection boiling are modeled for liquid oxygen (LOX) and liquid nitrogen (LN2). Large temperature differences between the cryogenic fluid and baring contact surfaces require detailed nodal representation in these areas. Internal loads and friction heat are affected by temperature dependent operating clearances requiring iterations between bearing thermal and mechanical models. Analyses indicate a thermal-mechanical coupling resulting in reduced operating clearances, increased loading and heating which can contribute to premature bearing failure. Contact surfaces operate at temperatures above local saturation resulting in vapor rather than liquid in the contacts, precluding possible liquid film lubrication. Elevated temperatures can reduce lubrication, increase friction, and reduce surface hardness supporting a surface failure mode rather than subsurface fatigue. B.G.

N85-26880*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.
HYBRID BEARINGS FOR LH2 AND LO2 TURBOPUMPS c37
M. F. Butner and F. C. Lee *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 220-244 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

Hybrid combinations of hydrostatic and ball bearings can improve bearing performance for liquid hydrogen and liquid oxygen turbopumps. Analytic studies were conducted to optimize hybrid bearing designs for the SSME-type turbopump conditions. A method to empirically determine damping coefficients was devised. Four hybrid bearing configurations were designed, and three were fabricated. Six hybrid and hydrostatic-only bearing configurations will be tested for steady-state and transient performance, and quantification of damping coefficients. The initial tests were conducted with the liquid hydrogen bearing. Author

N85-26881*# TRW Aircraft Components Group, Cleveland, Ohio.
POWDER METALLURGY BEARINGS FOR ADVANCED ROCKET ENGINES Abstract Only c37
J. N. Fleck, B. J. Killman, and H. Munson *In* NASA. Marshall Space Flight Center Advan. High Pressure 02/H2 Technol. Apr. 1985 p 245 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

Traditional ingot metallurgy was pushed to the limit for many demanding applications including antifriction bearings. New systems require corrosion resistance, better fatigue resistance, and higher toughness. With conventional processing, increasing the alloying level to achieve corrosion resistance results in a decrease in other properties such as toughness. Advanced powder metallurgy affords a viable solution to this problem. During powder manufacture, the individual particle solidifies very rapidly; as a consequence, the primary carbides are very small and uniformly distributed. When properly consolidated, this uniform structure is preserved while generating a fully dense product. Element tests including rolling contact fatigue, hot hardness, wear, fracture toughness, and corrosion resistance are underway on eleven candidate P/M bearing alloys and results are compared with those for wrought 440C steel, the current SSME bearing material. Several materials which offer the promise of a significant improvement in performance were identified. Author

N85-26882*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ROLLING CONTACT FATIGUE LIFE OF CHROMIUM ION PLATED 440C BEARING STEEL c37
Biliyar N. Bhat and Jack H. Davis (Alabama Univ., Huntsville) *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 246-260 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

Rolling contact fatigue (RCF) test specimens of heat treated 440C bearing steel were chromium ion plated in thicknesses from 0.1 to 8.0 micron and tested in RCF tester using 700 ksi maximum Hertzian stress. Heavy coatings, greater than about 5 micron in thickness, peeled off or spalled readily, whereas thin coatings, less than 3 micron thick, were tenacious and did not come off. Furthermore, significant improvement in RCF life was obtained with thin chromium ion plated test specimens. The average increase in B10 life was 75% compared with unplated 440C. These preliminary results indicate that ion plating is a promising way to improve bearing life. Author

N85-26883*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TECHNICAL OVERVIEW STRUCTURAL DYNAMICS Abstract Only c39
Larry Kiefling *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 261 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

Structural dynamics technology development in support of SSME was initiated in November 1980. The objective identified was to develop improved understanding of the operating dynamic characteristics of high-performance liquid rocket systems in order to: increase lifetime and performance; decrease weight; identify incipient failures; meet deflection requirements; decrease costs; predict effect of imposed changes; and determine changes to meet specified requirements. A series of tasks was identified and work was started on the most urgent tasks. In 1983, the program was made into a joint program with NASA-Lewis Research Center. Author

N85-26884*# Wyle Labs., Inc., Huntsville, Ala.
SIGNAL ANALYSIS TECHNIQUES FOR INCIPIENT FAILURE DETECTION IN TURBOMACHINERY c37
Thomas Coffin *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 262-276 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13I

Signal analysis techniques for the detection and classification of incipient mechanical failures in turbomachinery were developed, implemented and evaluated. Signal analysis techniques available to describe dynamic measurement characteristics are reviewed. Time domain and spectral methods are described, and statistical classification in terms of moments is discussed. Several of these waveform analysis techniques were implemented on a computer and applied to dynamic signals. A laboratory evaluation of the methods with respect to signal detection capability is described. Plans for further technique evaluation and data base development to characterize turbopump incipient failure modes from Space Shuttle main engine (SSME) hot firing measurements are outlined. Author

N85-26885*# Wyle Labs., Inc., Huntsville, Ala.
FLOW DYNAMIC ENVIRONMENT DATA BASE DEVELOPMENT FOR THE SSME c39
C. V. Sundaram *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 277-288 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

The fluid flow-induced vibration of the Space Shuttle main engine (SSME) components are being studied with a view to correlating the frequency characteristics of the pressure fluctuations in a rocket engine to its operating conditions and geometry. An overview of the data base development for SSME test firing results and the interactive computer software used to access, retrieve, and plot or print the results selectively for given thrust levels, engine numbers, etc., is presented. The various statistical methods available in the computer code for data analysis are discussed. Plots of test data, nondimensionalized using parameters such as fluid flow velocities, densities, and pressures, are presented. Results are compared with those available in the literature. Correlations between the resonant peaks observed at higher frequencies in power spectral density plots with pump geometry and operating conditions are discussed. An overview of the status of the investigation is presented and future directions are discussed. A.R.H.

N85-26886*# Dayton Univ., Ohio. Research Inst.
TURBINE BLADE FRICTION DAMPING STUDY c39
Robert J. Dominic *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 289-317 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13I

A lumped parameter method, implemented on a VAX 11/780 computer shows that the primary parameters affecting the performance of the friction damper of the first stage turbine of the SSME high pressure fuel pump are: the damper-blade coefficient of friction; the normal force applied to the friction interface; the amplitude of the periodic forcing function; the relative phase angle of the forcing functions for adjacent blades bridged by a damper (effectively, the engine order of the forcing function); and the amount of hysteretic damping that acts to limit the vibration amplitude of the blade in its resonance modes. The low order flexural resonance vibration modes of HPFTP blades without dampers, with production dampers, and with two types of

lightweight experimental dampers were evaluated in high speed spin pit tests. Results agree with those of the analytical study in that blades fitted with production friction dampers experienced the airfoil-alone flexural resonance mode, while those without dampers or with lighter weight dampers did not. No blades fitted with dampers experienced the whole blade flexural resonance mode during high speed tests, while those without dampers did. A.R.H.

N85-26887*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NONLINEAR STRUCTURAL ANALYSIS FOR FIBER-REINFORCED SUPERALLOY TURBINE BLADES c39
D. A. Hopkins and C. C. Chamis *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 318-340 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

A computational capability for predicting the nonlinear thermo-mechanical structural response of fiber-reinforced superalloy (FRS) turbine blades is described. This capability is embedded in a special purpose computer code (COBSTRAN) developed at the NASA Lewis Research Center. Special features of this computational capability include accounting for: fiber/matrix reaction, nonlinear and anisotropic material behavior, complex stress distribution due to local and global heterogeneity, and residual stresses due to initial fabrication and/or inelastic behavior during subsequent missions. Numerical results are presented from analyses of a hypothetical FRS turbine blade subjected to a fabrication process and subsequent mission cycle. The results demonstrate the capabilities of this computational tool to; predict local stress/strain response and capture trends of local nonlinear and anisotropic material behavior, relate the effects of this local behavior to the global response of a multilayered fiber-composite turbine blade, and trace material history from fabrication through successive missions. Author

N85-26888*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ROTORDYNAMICS c37
Luke A. Schutzenhofer *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 341-344 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13I

Research activities that can ultimately lead to optimum rotordynamics design for the space shuttle main engine are outlined. Achievements are summarized in: (1) improving analysis and simulation techniques; (2) defining forces which result from the rotor and surroundings; (3) determining the effect of rubbing; (4) improving balancing; (5) developing damping methods, i.e., eddy-current and damping seals; (6) establishing methods to quantify internal friction; and (7) developing supporting test apparatus. A.R.H.

N85-26889*# Control Dynamics Co., Huntsville, Ala.
EFFECTS OF BEARING DEADBANDS ON BEARING LOADS AND ROTOR STABILITY c39
John R. Glaese and Angelia P. Bukley *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 345-365 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

The Jeffcott model of a turbopump which was modified by adding deadband (clearance) effects along with fluid seal forces are currently understood. Equations of motion for the model were written in polar coordinates, and a constant side force was added to the model to account for the likely misalignment between bearings and seals. The force models and system equations of motion are described as well as limit cycle, and stability analyses. Studies of systems with rotor imbalance and with or without side effects were studied for three types of motion. Results show that: (1) deadband does not affect stability-in-the-large; (2) stability-in-the small is enhanced by deadband and side force; (3) bearings loads are highest for motion with synchronous or nonsynchronous periodic enclosing origin; (4) side force acting in concert with deadband effects may either increase or decrease bearing loads; and (5) bearing loads in a stable pump are determined primarily by rotor imbalance and side forces. A.R.H.

N85-26890*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PRELIMINARY RESULTS ON PASSIVE EDDY CURRENT DAMPER TECHNOLOGY FOR SSME TURBOMACHINERY c37
Robert E. Cunningham *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 366-380 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13I

Some preliminary results have been obtained for the dynamic response of a rotor operating over a speed range of 800 to 10,000 rpm. Amplitude frequency plots show the lateral vibratory response of an unbalanced rotor with and without external damping. The mode of damping is by means of eddy currents generated with 4 c shaped permanent magnets installed at the lower bearing of a vertically oriented rotor. The lower ball bearing and its damper assembly are totally immersed in liquid nitrogen at a temperature of -197 deg C (-320 deg F). These preliminary results for a referenced or base line passive eddy current damper assembly show that the amplitude of synchronous vibration is reduced at the resonant frequency. Measured damping coefficients were calculated to phi = .086; this compares with a theoretically calculated value of phi = .079. Author

N85-26891*# Mechanical Technology, Inc., Latham, N. Y.
DEVELOPMENT AND APPLICATION OF A UNIFIED BALANCING APPROACH WITH MULTIPLE CONSTRAINTS c39
Edward S. Zorzi, C. Chester Lee, and John C. Giordano *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 381-399 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

The development of a general analytic approach to constrained balancing that is consistent with past influence coefficient methods is described. The approach uses Lagrange multipliers to impose orbit and/or weight constraints; these constraints are combined with the least squares minimization process to provide a set of coupled equations that result in a single solution form for determining correction weights. Proper selection of constraints results in the capability to: (1) balance higher speeds without disturbing previously balanced modes, thru the use of modal trial weight sets; (2) balance off-critical speeds; and (3) balance decoupled modes by use of a single balance plane. If no constraints are imposed, this solution form reduces to the general weighted least squares influence coefficient method. A test facility used to examine the use of the general constrained balancing procedure and application of modal trial weight ratios is also described. A.R.H.

N85-26892*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ROTOR RESPONSE FOR TRANSIENT UNBALANCE CHANGES IN A NONLINEAR SIMULATION c37
M. J. Hine, C. E. Landis, and R. F. Beatty *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 400-424 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

Transient unbalance shifts were determined not to excite a rotor instability in the high pressure turbomachinery of the Space Shuttle Main Engine using the current rotor dynamic models. Sudden unbalance changes of relatively small magnitudes during fast-speed ramps showed stable nonsynchronous motion depending on the resultant unbalance distribution at subsequent high speed dwells. Transient moment unbalance may initiate a limit cycle subsynchronous response that shortly decays, but a persistent subsynchronous with large amplitudes was never achieved. These limit cycle subsynchronous amplitudes appear to be minimized with lower unbalance magnitudes, which indicates improved rotor balancing would sustain synchronous motion only. The transient unbalance phenomenon was determined to be an

explanation for synchronous response shifts often observed during engine tests. R.J.F.

N85-26893*# Wyle Labs., Inc., Huntsville, Ala. Scientific Services and Systems Group.
DAMPING SEAL VERIFICATION SETUP c37
Klaus L. Cappel *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 425-437 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11A

The heart of the Space Shuttle Main Engine (SSME) is a set of turbopumps that propel cryogenic fluids at very high pressures and flow rates, at rotor speeds up to 37,000 rpm. Bushing seals that cause the flow in the fluid film to become turbulent, by means of a multiplicity of pockets, were shown theoretically not only to inhibit subsynchronous whirl, but to reduce leakage as well. However, experimental data that relate these two desirable characteristics to such parameters as pocket depth, Reynolds number (based on clearance and axial flow rate), and rotating speed are limited. To obtain the required data, NASA's Marshall Space Flight Center (MSFC) commissioned Wyle Laboratories to design, build and operate a test rig in which the damping efficacy and leakage reduction of typical candidate seals are to be evaluated. R.J.F.

N85-26894*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DAMPING SEALS FOR TURBOMACHINERY c37
George L. vonPragenau *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 438-451 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11A

Rotor whirl stabilization of high performance turbomachinery which operates at supercritical speed is discussed. Basic whirl driving forces are reviewed. Stabilization and criteria are discussed. Damping seals are offered as a solution to whirl and high vibration problems. Concept, advantages, retrofitting, and limits of damping seals are explained. Dynamic and leakage properties are shown to require a rough stator surface for stability and efficiency. Typical seal characteristics are given for the case of the high pressure oxidizer turbopump of the Space Shuttle. Ways of implementation and bearing load effects are discussed. R.J.F.

N85-26895*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
VIBRATION CHARACTERISTICS OF THE HPOTP (HIGH PRESSURE OXYGEN TURBOPUMP) OF THE SSME (SPACE SHUTTLE MAIN ENGINE) c39
Dara W. Childs and David S. Moyer *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol Apr. 1985 p 452-481 refs (For primary document see N85-26862 16-20) (Contract NAS8-34505)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

A review is presented of various rotordynamic problems which have been encountered and eliminated in developing the current flight engines, and continuing subsynchronous problems which are being encountered in developing a 109% power level engine. The basic model for the High Pressure Oxygen Turbopump (HPOTP) of the SSME including the structural dynamic model for the rotor and housing and component models for the liquid and gas seals, turbine-clearance excitation forces, and impeller-diffuser forces are discussed. Results from a linear model are used to examine the synchronous response and stability characteristics of the HPOTP, examining bearing load and stability problems associated with the second critical speed. Various seal modifications are examined and shown to have favorable consequences with respect to bearing reactions and stability. R.J.F.

N85-26896*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.
HOUSING FLEXIBILITY EFFECTS ON ROTOR STABILITY
L. B. Davis, E. A. Wolfe, and R. F. Beatty *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 482-507 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

Preliminary rotordynamic evaluations are performed with a housing stiffness assumption that is typically determined only after the hardware is built. In addressing rotor stability, a rigid housing assumption was shown to predict an instability at a lower spin speed than a comparable flexible housing analysis. This rigid housing assumption therefore provides a conservative estimate of the stability threshold speed. A flexible housing appears to act as an energy absorber and dissipated some of the destabilizing force. The fact that a flexible housing is usually asymmetric and considerably heavier than the rotor was related to this apparent increase in rotor stability. Rigid housing analysis is proposed as a valuable screening criteria and may save time and money in construction of elaborate housing finite element models for linear stability analyses. R.J.F.

N85-26897*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FLUID AND GAS DYNAMICS Abstract Only c34
L. Povinelli (NASA. Lewis Research Center) and H. Struck *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 508-510 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20D

A clearer understanding of the interactions of the hot gas flow with the structure in the duct system, the flow passages of the rotating machinery, and the thrust chamber nozzle is sought for the purpose of finding ways and means to increase the life and performance of the systems. The objective of the transient nozzle test is to understand the shock-boundary layer interactions during transient flow and the resulting large side forces acting on the nozzle skirt. The Fluctuating Pressures in Ducts study deals mainly with the fluid-structural interactions of the lox post tube banks in the injector. The Ablative Nozzle Insert Study (H4) has as its goal the performance improvement of the space shuttle main engine. R.J.F.

N85-26898*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.
EXPERIMENTAL EVALUATION OF AN ADVANCED SPACE SHUTTLE MAIN ENGINE HOT-GAS MANIFOLD DESIGN CONCEPT
D. G. Pelaccio, F. F. Lepore, G. M. OConnor, G. V. R. Rao, G. H. Ratekin, and S. T. Vogt *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 512-547 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

This study, using an extensively modified, full-scale space shuttle main engine (SSME) hot-gas manifold (HGM), established a detailed aerodynamic data base to support development of an advanced, three-dimensional, fluid-dynamic analysis computer model. In addition, the advanced SSME hot-gas manifold design used in this study demonstrated improved flow environment (uniformity) in the fuel side turbine exit and transfer duct exit regions. Major modifications were incorporated in the full-scale HGM flow test article model using two large transfer ducts on the fuel turbine side of the HGM in place of the three small transfer ducts in the present design. Other model features included an increases in the flow areas downstream of the 180-degree turn and in the fishbowl regions. R.J.F.

N85-26899*# Lockheed Missiles and Space Co., Huntsville, Ala.
NUMERICAL ANALYSIS OF FLOW NON-UNIFORMITY IN THE HOT GAS MANIFOLD OF THE SPACE SHUTTLE MAIN ENGINE
J. Thoenes, S. J. Robertson, A. W. Ratliff, and P. G. Anderson (Continuum, Inc.) *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 548-559 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

Three-dimensional viscous flow in a conceptual hot gas manifold (HGM) for the Space Shuttle Main Engine High Pressure

Fuel Turbopump (SSME HPFTP) was numerically analyzed. A finite difference scheme was used to solve the Navier-Stokes equations. The exact geometry of the SSME HGM was modeled using boundary fitted curvilinear coordinates and the General Interpolants Method (GIM) code. Slight compressibility of the subsonic flow was modeled using a linearized equation of state with artificial compressibility. A time relaxation method was used to obtain a steady state solution. The feasibility and potential usefulness of computational methods in assisting the design of SSME components which involves the flow of fluids within complex geometrical shapes is demonstrated. E.A.K.

N85-26900*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FUEL AND OXIDIZER TURBINE LOSS ANALYSIS
Jeffrey E. Haas *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 560-570 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

The turbine losses for the fuel and oxidizer turbines at the FPL condition were assessed by a quasi-3D loss analysis method. This loss analysis method uses two flow codes - MERIDL and TSONIC - to calculate the flow velocities along the blade surfaces and endwalls. The velocities are then used as input to the boundary layer code - BLAYER - to calculate the friction losses due to incidence, secondary flow, and tip clearance. The loss analysis for the fuel turbine indicated an overall two-stage efficiency of about 90%. The largest loss was due to rotor tip clearance. The loss analysis for the oxidizer turbine is nearly completed. Results for the first stage of the two-stage design indicates an efficiency of about 80%, with high losses due to rotor incidence and blade and endwall friction. E.A.K.

N85-26901*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
REDISTRIBUTION OF THE INLET TEMPERATURE PROFILE THROUGH THE SSME FUEL TURBINE
John R. Schwab *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 571-578 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

A three-dimensional Euler code was used to predict radial inlet temperature profile redistribution through the two-stage fuel turbopump turbine. The calculation was made at the FPL condition using a turbine inlet radial temperature profile. This same calculation was made earlier on single-stage turbine. There was a redistribution of the temperature profile such that the hotter gas that originated at the midspan region at the turbine inlet was shifted to the hub and tip regions on the blade pressure surface at the rotor exit. For the SSME fuel turbine, however, there was no redistribution of the inlet temperature profile. No strong secondary flow patterns were identified. It is indicated that this trend is attributed to the high solidity SSME blading. E.A.K.

N85-26902*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYTICAL STUDY OF FLOW PHENOMENA IN SSME TURNAROUND DUCT GEOMETRIES c34
Kerry L. McLallin *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 579-598 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20D

The SSME fuel turbopump hot gas manifold was identified as a source of loss and flow distortion which significantly affects the performance and durability of both the drive turbine and the LOX injector area of the main combustion chamber. Two current SSME geometries were studied, the full power level (FPL) and the first manned orbital flight (FMOF) configuration. The effects of turnaround duct geometry on flow losses and distortions, by varying wall curvature and flow area variation in the 180 deg turnaround region were examined. The effects of the duct inlet flow phenomena such as the radial distortion of the inlet flow and inlet swirl level on turnaround duct performance were also investigated. It is shown that of the two current geometries, the FMOF configuration had lower pressure losses and generated less flow distortion, but had a small flow separation bubble at the 180 deg turnaround exit. It is found that by optimizing wall curvature and flow diffusion in the turnaround, improved duct performance can be achieved. E.A.K.

N85-26903*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INSTRUMENTATION TECHNOLOGY OVERVIEW Abstract Only c35
W. C. Nieberding *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 599-602 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

The Instrumentation Technology program advances the state of the art of instrumentation associated with the SSME to improve service life and performance by providing increased measurement capability. Two broad categories of instrumentation technology are sought. The first category includes sensors and systems destined to be used in and on the operational engine either during operation or between operations. These measurements supply information necessary for engine control and/or diagnostics throughout the life of the engine. The second category includes measurement systems and techniques whose application will be to engine component test stands and possibly to the test bed engine. The measurements provide the detailed information necessary to verify computer models of the performance of the various engine subsystems. E.A.K.

N85-26904*# United Technologies Research Center, East Hartford, Conn.
FIBER OPTIC RAMAN THERMOMETER FOR SPACE SHUTTLE MAIN ENGINE PREBURNER PROFILING c35
John A. Shirley *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 603-617 refs (For primary document see N85-26862 16-20)
(Contract NAS8-34655)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

The feasibility of combustion gas temperature measurements in the SSME fuel preburner using nonintrusive optical diagnostics was investigated. Temperature profiles are desired in the high pressure, hydrogen-rich preburner stream to evaluate designs to alleviate thermal stressing of the fuel pump turbine blades. Considering the preburner operating conditions and optical access restrictions, a spontaneous Raman backscattering system, implemented with optical fibers to couple to the combustion device, was selected as the most practical for gas temperature probing. A system is described which employs a remotely-located argon-ion laser to excite the molecular hydrogen Raman spectrum. The laser radiation is conveyed to the combustor through an optical fiber and focused through a window into the chamber by an optical head attached to the combustor. The gas temperature is determined from the distribution of rotational populations represented in the Raman spectrum. E.A.K.

N85-26905*# Honeywell, Inc., Minneapolis, Minn. Solid State Electronic Div.
AN ADVANCED SOLID STATE PRESSURE TRANSDUCER FOR HIGH RELIABILITY SSME APPLICATION c35
R. L. Johnson and D. B. Wamstad *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 618-638 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

New methods to advance the state-of-the-art of pressure sensors for the Space Shuttle Main Engine were demonstrated. The results of the feasibility and breadboard demonstration phase and the current status of the research development prototype follow-on phase are presented. A technology breakthrough utilizing silicon piezoresistive technology was achieved in the first phase. A transducer design concept for the SSME application utilizes packaging materials with similar thermal coefficients of expansion and maintains the transducer seals primarily in compression. The silicon chip design will provide dual sensing outputs

with laser trimmable integrated compensating electronics. The silicon resistor ion implant dose was customized for the SSME temperature requirement. A basic acoustic modeling software program was developed to evaluate the frequency response characteristics for the package design. E.A.K.

N85-26906*# National Bureau of Standards, Boulder, Colo. Chemical Engineering Science Div.

VORTEX SHEDDING FLOWMETERS FOR LIQUIDS AT HIGH FLOW VELOCITIES **c35**

J. D. Siegwarth *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 639-653 refs (For primary document see N85-26862 16-20)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

A number of vortex shedding flowmeter designs for flow measurements in liquid oxygen ducts on the space shuttle main engines have been tested in a high head water flow test facility. The results have shown that a vortex shedding element or vane spanning the duct can give a linear response to an average flow velocity of 46 m/s (150 ft/s) in a 1 1/2 inch nominal (41 mm actual) diameter duct while a vane partially spanning the duct can give a linear response to velocities exceeding 55 m/s (180 ft/s). The maximum pressure drops across the flow sensing elements extrapolate to less than 0.7 MPa (100 psi) at 56 m/s (184 ft/s) for liquid oxygen. The test results indicate that the vanes probably cannot be scaled up with pipe size, at least not linearly. Author

N85-26907*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.

REUSABLE ROCKET ENGINE TURBOPUMP CONDITION MONITORING

M. E. Hampson and S. Barkhoudarian *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 654-673 ref (For primary document see N85-26862 16-20)

(Contract NAS3-23349)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

Significant improvements in engine readiness with attendant reductions in maintenance costs and turnaround times can be achieved with an engine condition monitoring system (CMS). The CMS provides real time health status of critical engine components, without disassembly, through component monitoring with advanced sensor technologies. Three technologies were selected to monitor the rotor bearings and turbine blades: the isotope wear detector and fiber optic deflectometer (bearings), and the fiber optic pyrometer (blades). Signal processing algorithms were evaluated and ranked for their utility in providing useful component health data to unskilled maintenance personnel. Design modifications to current configuration Space Shuttle Main Engine (SSME) high pressure turbopumps and the MK48-F turbopump were developed to incorporate the sensors. Author

N85-26908*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.

NONINTRUSIVE SHAFT SPEED SENSOR **c35**

S. Barkhoudarian, L. Wyett, and J. Maram *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 674-693 refs (For primary document see N85-26862 16-20)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

Reusable rocket engines such as the Space Shuttle Main Engines (SSME), the Orbital Transfer Vehicles (OTV), etc., have throttling capabilities that require real-time, closed-loop control systems of engine propellant flows, combustion temperatures and pressures, and turbopump rotary speeds. In the case of the SSME, there are four turbopumps that require real-time measurement and control of their rotary speeds. Variable-reluctance magnetic speed sensors were designed, fabricated, and tested for all four turbopumps, resulting in the successful implementation and operation of three of these speed sensors during each of the 12 Shuttle flights. G.L.C.

N85-26909*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

IGNITION/COMBUSTION PROCESSES Abstract Only **c25**

D. E. Pryor *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 694-695 (For primary document see N85-26862 16-20)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 21B

The overall objectives for this initial technology are to generate an advanced, comprehensive combustion analytical code, and to verify the combustion flow dynamic predictions from this model with hot test experimental data. G.L.C.

N85-26910*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.

LIQUID ROCKET COMBUSTOR COMPUTER CODE DEVELOPMENT

P. Y. Liang *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 696-716 refs (For primary document see N85-26862 16-20)

(Contract NAS8-34928)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

The Advanced Rocket Injector/Combustor Code (ARICC) that has been developed to model the complete chemical/fluid/thermal processes occurring inside rocket combustion chambers are highlighted. The code, derived from the CONCHAS-SPRAY code originally developed at Los Alamos National Laboratory incorporates powerful features such as the ability to model complex injector combustion chamber geometries, Lagrangian tracking of droplets, full chemical equilibrium and kinetic reactions for multiple species, a fractional volume of fluid (VOF) description of liquid jet injection in addition to the gaseous phase fluid dynamics, and turbulent mass, energy, and momentum transport. Atomization and droplet dynamic models from earlier generation codes are transplated into the present code. Currently, ARICC is specialized for liquid oxygen/hydrogen propellants, although other fuel/oxidizer pairs can be easily substituted. Author

N85-26911*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.

LASER SCHLIEREN AND ULTRAVIOLET DIAGNOSTICS OF ROCKET COMBUSTION **c25**

S. C. Fisher *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 717-731 (For primary document see N85-26862 16-20)

(Contract NAS8-34728)

Avail: NTIS HC A99/MF E03; SOD HC CSCL 21B

A low pressure oxygen/hydrogen turbine drive combustor hot-fire test series was conducted on the Turbine Drive Combustor Technology Program. The first objective was to gather data on an axisymmetric combustion system to support anchoring of a new combustion/fluid dynamics computer code under development on the same contract. The second objective was to gain insight into low mixture ratio combustion characteristics of coaxial injector elements. Author

N85-26912*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TETHERED NUCLEAR POWER FOR THE SPACE STATION

David J. Bents 1985 27 p refs Proposed for presentation at the 20th Intersoc. Energy Conversion Eng. Conf. (IECEC), Miami Beach, Fla., 18-23 Aug. 1985; sponsored by SAE, ANS, ASME, IEEE, AIAA, ACS, and AIChE

(NASA-TM-87023; E-2572; NAS 1.15:87023) Avail: NTIS HC A03/MF A01 CSCL 18L

A nuclear space power system the SP-100 is being developed for future missions where large amounts of electrical power will be required. Although it is primarily intended for unmanned spacecraft, it can be adapted to a manned space platform by tethering it above the station through an electrical transmission line which isolates the reactor far away from the inhabited platform and conveys its power back to where it is needed. The transmission line, used in conjunction with an instrument rate shield, attenuates reactor radiation in the vicinity of the space station to less than one-one hundredth of the natural background which is already there. This combination of shielding and distance attenuation is less than one-tenth the mass of boom-mounted or on-

board man-rated shields that are required when the reactor is mounted nearby. This paper describes how connection is made to the platform (configuration, operational requirements) and introduces a new element the coaxial transmission tube which enables efficient transmission of electrical power through long tethers in space. Design methodology for transmission tubes and tube arrays is discussed. An example conceptual design is presented that shows SP-100 at three power levels 100 kWe, 300 kWe, and 1000 kWe connected to space station via a 2 km HVDC transmission line/tether. Power system performance, mass, and radiation hazard are estimated with impacts on space station architecture and operation. B.W.

N85-26913*# Allied Bendix Aerospace, Teterboro, N.J.
A GIMBAL SIZING ANALYSIS FOR AN IPACS ROTATING ASSEMBLY
P. R. Burke and P. A. Coronato May 1985 56 p refs
(Contract NAS1-17658)
(NASA-CR-172524; NAS 1.26:172524) Avail: NTIS HC A04/MF A01 CSCL 21H

All major components of an integrated power/attitude control system (IPACS) assembly were analyzed for testing, launch, and operational stresses. The conceptual design for the outer gimbal and mounting ring structures were developed and analyzed along with preliminary designs of the pivot and torquer assemblies. Results from the system response analysis and the thermal analysis are also presented. Gimballing of this rotating assembly should present few difficulties as the maximum gimballing rate is quite low. However, the inner gimbal assembly in its current configuration must be modified to develop the system from a laboratory concept to a realistic flight hardware status. Author

N85-26914# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
APPLICATION OF THE HYDRAULIC SYSTEM FREQUENCY RESPONSE PROGRAM TO PROPELLANT FEED SYSTEMS M.S. Thesis
B. S. DeHoff Dec. 1984 194 p
(AD-A151824; AFIT/GA/AA/80M-1) Avail: NTIS HC A09/MF A01 CSCL 21/9

This thesis applies the Hydraulic System Frequency Response (HSFR) computer program to a liquid propellant feed system analysis. During this investigation, the HSFR program was used to predict the oscillatory pressure, flow and impedance conditions existing in an experimental Saturn V first stage LOX suction duct. When necessary to model this system, additional capabilities were added to the program during this investigation. The results from the HSFR analysis are compared to previously published experimental and analytical data for this system. In this comparison, the HSFR program computed resonant frequencies which were between 0 and 3.6% higher than the test data. The sensitivity of the results to changes in the input model was also investigated. The results from this investigation indicate that the theoretical approach of the HSFR program is valid for large diameter feed systems, and recommendations for further model improvements are made. GRA

N85-26915# IAP Research, Inc., Dayton, Ohio.
ADVANCED ENERGY STORAGE SYSTEMS Final Report, 1 Jun. 1982 - 1 Sep. 1984
A. Challita, J. P. Barber, and T. J. McCormick Jan. 1985 213 p
(Contract F04611-82-C-0029)
(AD-A152244; IAP-TR-83-7; AFRPL-TR-84-099) Avail: NTIS HC A10/MF A01 CSCL 21/3

This report describes the selection, sizing, and optimization of energy storage/power conditioning systems (ES/PC) for the electromagnetic propulsion systems. An ES/PC is the interface between an electromagnetic thruster and a primary power source. The ES/PC accepts the relatively low, continuous power output from the primary power source, and converts it to a series of high power pulses and delivers it to the thruster. THe ES/PC minimizes the primary power requirements while maximizing the thruster performance. A selection, sizing, and optimization can be achieved if an optimization criterion exists, and if the ES/PC is examined within the context of the integrated propulsion system. We selected mass minimization as the optimization criterion. To develop the selection methodology, we identified the requirements imposed om the ES/PC and parametrically related the ES/PC performance to the propulsion system outputs. GRA

N85-26916# Argonne National Lab., Ill. Components Technology Div.
FLOW-INDUCED VIBRATION OF THE SSME LOX POSTS: ADDITIONAL ISSUES
S. S. Chen Dec. 1984 22 p refs
(Contract W-31-109-eng-38)
(DE85-007339; ANL-85-8) Avail: NTIS HC A02/MF A01

A mathematical model is presented for flow induced vibration of the Space Shuttle Main Engine (SSME) liquid oxygen (LOX) posts. The definition of the critical flow velocity is addressed, and detuning of the vibrations of the LOX posts is discussed. Nonuniform flow distributions in the axial and transverse directions are examined briefly, followed by upstream turbulence. The dependence of response upon post location is addressed briefly. Scruton's number, a mass damping parameter, is defined and its value for the SSME LOX posts is given. Also discussed are the interaction of turbulent buffeting and fluidelastic instability, post arrangement, and swirlers around the posts. The differences are discussed between the quasi-static, the analytical, and the general analytical mathematical models. DOE

N85-26917# Oak Ridge National Lab., Tenn.
ANALYSIS OF ALKALI LIQUID METAL RANKINE SPACE POWER SYSTEMS
G. L. Yoder and R. I. Graves 1985 7 p refs Presented at the 2nd Symp. on Space Nucl. Power Systems, Albuquerque, N. Mex., 14 Jan. 1985
(Contract DE-AC05-84OR-21400)
(DE85-005089; CONF-850103-6) Avail: NTIS HC A02/MF A01

Space power systems must have both high power density (kW/m(3)) and high specific power output (kW/kg), while maintaining high reliability. Several power source and conversion options are available. A sketch of the Rankine system under consideration is shown. The design for the 100 kWe system analyzed here uses the same basic design concept as described by Jones for a 5 MWe system. In brief, it consists of a uranium nitride fuel pin reactor core with a tungsten/lithium hydride shield. Potassium at approx. 25% quality exits the reactor core. A separator is used to provide potassium vapor (at approx. 99%+ quality) to a full impulse turbine. Liquid from the separator is recirculated back to the core inlet using jet pumps. A heat pipe radiator condenses the vapor exiting the turbine while a separate turbine driven boiler feed pump returns the condensed liquid to the core inlet. Sizes and weights for the various system components were determined using design algorithms or were scaled from previous design studies. DOE

N85-26918# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
SOLID FUEL COMBUSTION CHAMBER Progress Report, Jul.-Dec. 1983
H. F. R. Schoeyer, P. A. O. G. Korting, J. B. Vos, and J. P. M. Versmissen Dec. 1983 25 p refs Sponsored by Netherlands Foundation for Technical Research, Project Office for Energy Research, Delft Univ. of Technology and Prins Maurits Lab. TNO (VTH-LR-415; PML-1983-173) Avail: NTIS HC A02/MF A01

The financial, project management, experimental, and theoretical developments of an investigation of flow and combustion processes in a solid fuel grain are summarized. Combustion of PE and PMMA with N2-O2 mixtures; determination of the regression rate by the ultrasonic pulse echo technique; sonic control and measuring choke; and spectroscopy are described.
Author (ESA)

N85-26919# Technische Hogeschool, Delft (Netherlands). Dept. of Aeronautical Engineering.
SOLID FUEL COMBUSTION CHAMBER Progress Report,

Jan.-Jun. 1984
H. F. R. Schoeyer, P. A. O. G. Korting, J. B. Vos, and J. P. M. Vermissen Jul. 1984 17 p refs Sponsored by Netherlands Foundation for Technical Research, Project Office for Energy Research, Delft Univ. of Technology and Prins Maurits Lab. TNO
(VTH-LR-438; PML-1984-C63) Avail: NTIS HC A02/MF A01

The financial, project management, experimental, and theoretical developments of an investigation of flow and combustion processes in a solid fuel grain are summarized. A program describing two-dimensional turbulent flow without combustion and heat and mass transfer at the boundaries was tested for laminar pipe flow, turbulent pipe flow, laminar recirculation in a cylindrical pipe expansion, and turbulent recirculation flow. Author (ESA)

N85-26920# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
SOLID FUEL COMBUSTION CHAMBER RESEARCH IN THE NETHERLANDS
P. A. O. G. Korting and H. F. R. Schoeyer Sep. 1984 44 p refs Sponsored by Netherlands Foundation for Technical Research, Project Office for Energy Research, Delft Univ. of Technology and Prins Maurits Lab. TNO
(VTH-LR-444; PML-1984-C74; SPCC-P4bl-20) Avail: NTIS HC A04/MF A01

Research on solid fuel combustion chamber applications to Ramjets is summarized. Flow visualization; flow modeling; chemical kinetics; combustion instability; gas supply systems; flow control; a test stand; and experiments on regression rate and combustion efficiency are discussed. Author (ESA)

N85-26815# Joint Publications Research Service, Arlington, Va.
ION SENSOR SIGNAL FLUCTUATIONS DURING OPERATION OF SPACECRAFT REACTION ENGINES Abstract Only
V. P. Legostayev, V. D. Nikolayev, K. I. Saulin, M. B. Sukhovoy, and Ye. G. Ulyanov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 58 (For primary document see N85-26772 16-12) Avail: NTIS HC A06

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N85-26921*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
GRAPHITE FIBER INTERCALATION: . DYNAMICS OF THE BROMINE INTERCALATION PROCESS
Donald A. Jaworske and Reza Zinolabedini (Cleveland State Univ.) 21 Jun. 1985 10 p refs Presented at 17th Biennial Conf. Carbon, Lexington, Ky., 16-21 Jun. 1985; sponsored by American Carbon Society
(NASA-TM-87015; E-2441; NAS 1.15:87015) Avail: NTIS HC A02/MF A01 CSCL 11D

The resistance of pitch-based graphite fibers was monitored, in situ, during a series of bromine intercalation experiments. The threshold pressure for the bromine intercalation of pitch-based fibers was estimated to be 102 torr. When the bromine atmosphere was removed from the reaction chamber, the resistivity of the intercalated graphite fibers increased consistently. This increase was attributed to loss of bromine from the perimeter of the fiber. The loss was confirmed by mapping the bromine concentration across the diameter of single intercalated fibers with either energy dispersive spectroscopy or scanning Auger microscopy. A statistical study comparing fibers intercalated in bromine vapor with fibers intercalated in bromine liquid showed that similar products were obtained with both methods of intercalation. Author

N85-26870*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MATERIAL TECHNOLOGY Abstract Only
Robert L. Dreshfield (NASA. Lewis Research Center) and W. B. McPherson *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 91-92 (For primary document see N85-26862 16-20) Avail: NTIS HC A99/MF E03; SOD HC CSCL 11G

24 COMPOSITE MATERIALS

Includes laminates.

N85-26922 Rensselaer Polytechnic Inst., Troy, N. Y.
MECHANICAL PROPERTIES OF HIGH PERFORMANCE CARBON FIBERS Ph.D. Thesis
Kuang-Jung Chen 1984 208 p
Avail: Univ. Microfilms Order No. DA8500942

Carbon fibers often show a variation in axial preferred orientation across the fiber diameter which leads to a modulus gradient and residual stress. Theoretical equations of the residual stresses in radial, hoop and longitudinal directions were derived from linear elasticity based on a perfect onion skin model. The high hoop compressive stress in the surface causes a flute-like structure in the fiber surface, and the radial stress within the fiber will induce microcracks within the fiber. Another model, based on parallel-springs, was used to estimate the magnitude of the longitudinal stress which shows very good fit with the experimental data. Dissert. Abstr.

N85-26923*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NASA/AIRCRAFT INDUSTRY STANDARD SPECIFICATION FOR GRAPHITE FIBER TOUGHENED THERMOSET RESIN COMPOSITE MATERIAL
Washington Jun. 1985 58 p
(NASA-RP-1142; L-15946; NAS 1.61:1142) Avail: NTIS HC A04/MF A01 CSCL 11D

A standard specification for a selected class of graphite fiber/toughened thermoset resin matrix material was developed through joint NASA/Aircraft Industry effort. This specification was compiled to provide uniform requirements and tests for qualifying prepreg systems and for acceptance of prepreg batches. The specification applies specifically to a class of composite prepreg consisting of unidirectional graphite fibers impregnated with a toughened thermoset resin that produce laminates with service temperatures from -65 F to 200 F when cured at temperatures below or equal to 350 F. The specified prepreg has a fiber areal weight of 145 g sq m. The specified tests are limited to those required to set minimum standards for the uncured prepreg and cured laminates, and are not intended to provide design allowable properties. Author

N85-26924*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECT OF LOW-VELOCITY OR BALLISTIC IMPACT DAMAGE ON THE STRENGTH OF THIN COMPOSITE AND ALUMINUM SHEAR PANELS
Gary L. Farley (Army Research and Technology Lab., Hampton, Va.) May 1985 40 p refs
(DA Proj. 1L1-61102-H-4503)
(NASA-TP-2441; L-15942; NAS 1.60:2441; AVSCOM-TR-85-B-1) Avail: NTIS HC A03/MF A01 CSCL 11D

Impact tests were conducted on shear panels fabricated from 6061-T6 aluminum and from woven fabric prepreg of Du Pont Kevlara fiber/epoxy resin and graphite fiber/epoxy resin. The shear panels consisted of three different composite laminates and one aluminum material configuration. Three panel aspect ratios were evaluated for each material configuration. Composite panels were impacted with a 1.27-cm (0.05-in) diameter aluminum sphere at low velocities of 46 m/sec (150 ft/sec) and 67 m/sec (220 ft/sec). Ballistic impact conditions consisted of a tumbled 0.50-caliber projectile impacting loaded composite and aluminum shear panels. The results of these tests indicate that ballistic threshold load (the lowest load which will result in immediate failure upon penetration by the projectile) varied between 0.44 and 0.61 of the

average failure load of undamaged panels. The residual strengths of the panels after ballistic impact varied between 0.55 and 0.75 of the average failure strength of the undamaged panels. The low velocity impacts at 67 m/sec (220 ft/sec) caused a 15 to 20 percent reduction in strength, whereas the impacts at 46 m/sec (150 ft/sec) resulted in negligible strength loss. Good agreement was obtained between the experimental failure strengths and the predicted strength with the point stress failure criterion. Author

N85-26925*# Auburn Univ., Ala. Dept. of Mechanical Engineering.

MEASUREMENT OF DAMPING OF GRAPHITE EXPOXY MATERIALS Monthly Report, 1 Apr. - 30 Apr. 1985

M. J. Crocker 1 May 1985 15 p

(Contract NAS8-36146)

(NASA-CR-175793; NAS 1.26:175793) Avail: NTIS HC A02/MF A01 CSCL 11D

During this period damping measurements were made on the cylindrical graphite epoxy specimen using the forced-vibration test method. The specimen was carefully mounted directly on the shaker through the supporting ring and the impedance head. This was done to simulate an idealized free-free boundary condition at the two edges. The damping ratio value and the natural frequency (first mode) obtained in this experiment were 0.13% and 508.75 Hz respectively. In order to check the damping induced by the supporting ring, measurements were made with the top half of the ring removed. The specimen then was supported only by the bottom half of the ring (half ring). It was observed that the natural frequency of the specimen (first mode) increased of a value of 552.5 Hz due to the influence of the reduced mass of the supporting ring. But the damping ratio value obtained was the same as that obtained with full supporting ring, namely 0.13%. B.W.

N85-26926# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.

TEMPERATURE: CURVATURE RELATIONSHIPS FOR UNSYMMETRIC GRAPHITE-EPOXY LAMINATES

Akira Hamamoto (Ishikawajima-Harima Heavy Industries Co. Ltd., Tokyo, Japan) and M. W. Hyer Mar. 1985 52 p refs Sponsored in part by Ishikawajima-Harima Heavy Industries Co.

(VPI-E-85-08; CCMS-85-03) Avail: NTIS HC A04/MF A01

A geometrically nonlinear theory is used to study the relationship between temperature and curvature of unsymmetric elevated temperature cure graphite-epoxy laminates. The study extends previous work regarding the effect of laminate size on the room-temperature shape of unsymmetric laminates. Numerical results are obtained for square (0 sub 4/90 sub 4) sub T laminates of various sizes, specifically 50 x 50 mm, 125 x 125 mm, and 300 x 300 mm AS4/1908 laminates and a 150 x 150 mm AS4/3502 laminate. It is shown that over a certain temperature range the temperature - curvature relationship of unsymmetric laminates can bifurcate and be multivalued, specifically triple-valued. Over the remainder of the temperature range the relationship is single-valued. The multivalued relationship indicates that more than one laminate shape is possible at a given temperature. One possible shape is cylindrical, another possible shape is saddle, and the third possible shape is also cylindrical, this cylindrical shape being different than the other cylindrical shape. B.W.

N85-26927*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.

THE EFFECTS OF PIN ELASTICITY, CLEARANCE, AND FRICTION ON THE STRESSES IN A PIN-LOADED ORTHOTROPIC PLATE Interim Report

M. W. Hyer, E. C. Klang (Illinois Univ., Urbana-Champaign), and D. E. Cooper Mar. 1985 58 p refs

(Grant NAG1-343)

(NASA-CR-175816; NAS 1.26:175816; VPI-E-85-09; CCMS-85-04; IR-49) Avail: NTIS HC A04/MF A01 CSCL 11D

The effects of pin elasticity, clearance, and friction on the stresses in a pin loaded orthotropic plate are studied. The effects are studied by posing the problem as a planar contact elasticity problem, the pin and the plate being two elastic bodies which interact through contact. Coulomb friction is assumed, the pin loads the plate in one of its principal material directions, and the plate is infinite in extent. A collocation scheme and interaction, in conjunction with a complex variable series solution, are used to obtain numerical results. The contact region between the plate and pin is unknown and must be solved for as part of the solution. The same is true of the region of friction induced no slip. Two pin stiffnesses, two clearance levels, two friction levels and two laminates, a (o/+ or - 45/90) and a (02/+o2-45), are studied. The effects of pin elasticity, clearance, and friction on the load capacity of the plate are assessed by comparing the load capacity of the plate with the capacity when the pin is rigid, perfectly fitting, and frictionless. Author

N85-26928# Texas Univ., Austin. Center for Materials Science and Engineering.

MICROSCOPIC STUDY OF THE INFLUENCE OF IMPURITIES ON INTERFACE BONDING Annual Technical Report, 1 Dec. 1983 - 30 Nov. 1984

H. L. Marcus 25 Jan. 1985 68 p

(Contract N00014-83-K-0143)

(AD-A151725; UTCMSE-85-1) Avail: NTIS HC A04/MF A01 CSCL 11/4

Research on the relation between impurities and second phases at interfaces and their impact on the mechanical properties is reported. Model layered systems involving interfaces in Al/graphite MMC and the Ni-Ni system were investigated. In addition, model steel systems, both ferritic and austenitic were studied to evaluate segregation to the interface and the impact on fracture and stress corrosion cracking of the segregated species. In the layered structures the relation between the conductivity normal to the interface and the fracture path was evaluated under different interface processing conditions with a variety of experimental results. The method of preparation of the interface played a major role in the switching and fracture characteristics. In the steels a correlation between the segregation at the interface and the fraction of interface failure with the fracture toughness was evaluated. GRA

N85-26929# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.

DIRECTIONAL THERMAL CONDUCTIVITIES OF GRAPHITE-EPOXY COMPOSITES: 0/90 AND 0/+ OR - 45/90 Final Report, Jun. 1983 - Aug. 1984

L. S. Han and L. Glower Wright-Patterson AFB, Ohio AFWAL Jan. 1985 49 p

(Contract F33615-83-C-3000)

(AD-A152209; AFWAL-TR-84-3110) Avail: NTIS HC A03/MF A01 CSCL 11/4

This work and a predecessor investigation form a two-part experimental research program on the effective thermal conductivities of graphite-epoxy composites - the type which is used extensively in aerospace structures and other applications. Effective thermal conductivities were determined from 90 F to 250 F for composites with fibers arranged in the 0/90 and 0/+ or - 45/90 patterns. The fiber content was 60% by volume. Analysis of the data in this work and the predecessor study established a correspondence principle between the directional effective conductivities of composites with uni-directional fibers and conductivities of other types of fiber arrangements. The correspondence principle allows an approximate but rapid estimate of the quasi-isotropic conductivities of the commonly used balanced-composites. GRA

N85-26930# Oak Ridge National Lab., Tenn.

PARTICULATE AND WHISKER TOUGHENED ALUMINA COMPOSITES

T. N. Tiegs and P. F. Becher 1984 8 p refs Presented at Automotive Technol. Develop. Contractors' Coordination Meeting, Dearborn, Mich., 29 Oct. 1984

(Contract DE-AC05-84OR-21400)

(DE85-005239; CONF-8410103-7) Avail: NTIS HC A02/MF A01

Two approaches were examined for achieving an increase in fracture toughness (K/sub Ic/) in a ceramic matrix composite

system with Al2O3 as the matrix in both cases. Studies were conducted to determine if submicron metal particles distributed in the alumina matrix could effectively increase K/sub Ic/. Fracture surface and microstructural analyses of these composites indicated that the observed increases in K/sub Ic/ were due to a relatively large grain duplex microstructure developed in the Al2O3 during densification. The concept of utilizing SiC whiskers in a ceramic matrix was studied and the results in the Al2O3-SiC whisker system were particularly encouraging. The composites were hot pressed to essentially theoretical density. Some success was achieved in pressureless sintering these composites. The SiC whisker reinforced alumina composites were shown to have improved fracture toughness and strength compared to conventional monolithic alumina. These properties remain relatively constant up to temperatures of 1000(0)C. DOE

N85-26931# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
SIMULTANEOUS CHEMICAL VAPOR DEPOSITION OF SiC-DISPERSED PHASE COMPOSITES
D. P. Stinton and W. J. Lackey 1985 17 p refs Presented at the 9th Ann. Conf. on Composites and Advan. Ceram. Mater. and Workshop on Testing Methods for Ceram. Matrix Composites, Cocoa Beach, Fla., 20 Jan. 1985
(Contract DE-AC05-84OR-21400)
(DE85-007751; CONF-850122-4) Avail: NTIS HC A02/MF A01

Ceramic composites are being developed because they can have high strength and toughness yet retain the normal ceramic attributes of refractoriness and high resistance to abrasion and corrosion. Toughened ceramic composites were produced by the simultaneous chemical vapor deposition of an SiC matrix and a dispersed phase of TiSi2. The morphology of the dispersed phase was found to control the mechanical properties of the composite. Deposition of coatings in a fluidized bed produced a finer and more uniformly dispersed second phase. The conditions within the fluidized bed such as temperature, gas composition, and hydrogen flow also affected the morphology of the TiSi2 phase. The fracture toughness values for these composite coatings approached 5.5 MPa(RADICAL)m at 25(0) C, which is significantly higher than the toughness value for chemically vapor deposited SiC. DOE

N85-26932# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction des Materiaux.
EVALUATION OF THE PSP RESIN AS A PRECURSOR OF CARBON [EVALUATION DE LA RESINE PSP COMME PRECURSEUR DE CARBONE]
J. Jamet, C. Malivoir, and D. Abbe Aug. 1984 40 p refs In FRENCH
(Contract DRET-83-34-133)
(ONERA-RT-11/1784-M) Avail: NTIS HC A03/MF A01

The carbonization at 1000 C, the conversion to graphite and the applicability to carbon-carbon composites of polystyrylpyridine is evaluated. A positive conclusion is the high admissable pyrolysis velocity of 340 C/hr. These carbons are difficult to graphitize by the usual treatment (1 hr at 2500 deg C). A carbon-carbon composite with 110 MPa bending resistance was obtained. The application to matrix in carbon-carbon composites is limited by the high contraction observed (18% to 20%). Author (ESA)

N85-26933# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
DURABILITY OF ARAMID REINFORCED ALUMINUM LAMINATE (ARALL)
M. L. C. E. Verbruggen Mar. 1984 25 p refs Sponsored by Netherlands Foundation for Technical Research
(VTH-LR-423) Avail: NTIS HC A02/MF A01

Moisture absorption and the influence of moisture on the mechanical properties of Aramid Aluminum Laminate (ARALL) are examined. Standard durability aspects, fiber adhesive adhesion, and its role in the ARALL fracture mechanisms are discussed. Results show a high environmental resistance of fibers and adhesive. Author (ESA)

N85-26871*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.
DESIGN OVERVIEW OF FIBER-REINFORCED SUPERALLOY COMPOSITES FOR THE SPACE SHUTTLE MAIN ENGINE
J. R. Lewis *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 93-109 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11D

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N85-26934 Illinois Univ., Urbana.
AN EXPERIMENTAL INVESTIGATION OF TWO-DIMENSIONAL FLAME-VORTEX INTERACTIONS Ph.D. Thesis
Tsun-Wai Gary Yip 1984 112 p
Avail: Univ. Microfilms Order No. DA8502351

Experiments have been performed to study the interaction between a flame and a single vortex impulsively generated by the flame. The objectives are to investigate the amplitude of the cylindrically diverging acoustic wave produced by the interaction and to develop a quantitative approach to determine the degree of violence of the flame-vortex interaction. With the Reynolds number, defined as the ratio of the strength of the vortex to the kinematic viscosity of the unburned gas, characterizing the unburned gas flow condition quantitatively, the acoustic pressure delta p(t) generated by the interaction has been measured at distances 1.5, 1.75 and 2.0 meters away from the interaction zone using a microcomputer-based data acquisition system and a storage oscilloscope. The dimensionless time rate of change in the heat addition rate, Q(t), of the flame-vortex interaction, is deduced from the acoustic pressure data via the line source equation in linear acoustic theory. The Fast Fourier Transform has been used to perform the analysis. Dissert. Abstr.

N85-26935 Connecticut Univ., Storrs.
MODELING THE ROLE OF RADICALS IN THE IGNITION OF AND FLAME PROPAGATION IN HYDROGEN-AIR AND METHANE-AIR MIXTURES Ph.D. Thesis
Santi Wiriyawit 1984 216 p
Avail: Univ. Microfilms Order No. DA8503027

A model is developed for a transient, premixed, laminar flame in a closed one-dimensional adiabatic combustion chamber. The flame is ignited by a high-temperature plasma rich in H and OH radicals. Ignition and flame propagation are described by a numerical solution of the one-dimensional, compressible conservation equations for reactive flows. The numerical method makes use of a predictor corrector method and an implicit Euler method to integrate the fluid dynamic and chemical kinetic parts respectively. Hydrogen-air and methane-air mixtures are selected as the reactive gases. The effects of the magnitude and the form of the ignition energy is explored. An improvement in flame propagation and flame velocity is found only in the case where the OH radicals are allowed to spread out of the ignition source. For the methane-air mixtures, the results show that improvement in flame propagation and flame velocity is found in the case of plasma with high temperature and high radical concentrations. Dissert. Abstr.

N85-26936*# Aerodyne Research, Inc., Billerica, Mass. Center for Chemical and Environmental Physics.
A MEASUREMENT OF THE VIBRATIONAL BAND STRENGTH FOR THE UPSILON SUB 3 BAND OF THE HO2 RADICAL Final Report
Mark S. Zahniser and Alan C. Stanton Mar. 1985 35 p refs
(Contracts NASw-3607; CMA-FT-81-355)
(NASA-CR-175858; NAS 1.26:175858; RR-348) Avail: NTIS

HC A03/MF A01 CSCL 07D

The HO2 radicals generated in a discharge-flow system were observed with tunable diode laser absorption in the P-branch of the nu(3) vibrationall band at 1080/cm. The observed line positions agree with those calculated from the molecular constants for the nu(3) bland obtained from a previous study using laser magnetic resonance spectroscopy. The band strength was determined by observing line center absoptions when HO2 is produced in the reaction F + H2O2 yields HO2 + HF (k1) with a measured concentration of atomic fluorine and excess hydrogen peroxide. F-atom concentrations are measured by diode laser absorption of the spin-orbit transition at 404/cm. The analysis accounts for HO2 losses due to the reactions of HO2 + HO2 yields H2O2 + O2 (k3) and F + HO2 yields HF + O2 (k4). The line strength for the 6(15) < 7(16) F(1) transition is 2.9 x 10 to the 21st power sq cm/molecule/cm which corresponds to a nu(3) band strength of 34 +/- 9 sq/cm(STP atm). This value is a factor of 6 lower than previous ab initio calculations. These results will be useful in assessing the feasibility of atmospheric measurements of HO2 using infrared absorption techniques. M.G.

N85-26937*# Tracer Technologies, Inc., Escondido, Calif.
DEVELOPMENT OF A PERSISTENT CHEMICAL AGENT SIMULATION SYSTEM Final Report
23 Nov. 1983 42 p Prepared for JPL
(Contract NAS7-100)
(NASA-CR-175780; JPL-9950-1059; NAS 1.26:175780) Avail: NTIS HC A03/MF A01 CSCL 07D

A Persistent Chemical Agent Simulation System was developed (PCASS) to simulate, for force-on-force training exercises, the field environment produced by the presence of persistent chemical agents. Such a simulant system must satisfy several requirements to be of value as a training aid. Specifically, it must provide for realistic training which will generate competency in at least the following areas: (1) detection of the persistant agent presence; (2) proper use of protective equipment and procedures; (3) determination of the extent of contamination; and (4) decontamination of equipment and personnel. B.W.

N85-26938*# Angstrom Robotics and Technologies, Inc., Florence, Ky.
[DEVELOPMENT OF A PERSISTENT CHEMICAL AGENT SIMULATOR SYSTEM (PCASS)] Final Report
William G. McGinness 18 Nov. 1983 16 p refs
(Contract JPL-956632)
(NASA-CR-175776; NAS 1.26:175776) Avail: NTIS HC A02/MF A01 CSCL 07D

The development of a persistant chemical agent simulation system (PCASS) is described. This PCASS is to be used for the military training of troops to simulate actual chemical warfare. The purpose of this system is to facilitate in the determination of chemical contamination and effectiveness of decontamination for training purposes. The fluorescent tracer employed has no daylight activation, but yet is easily removed with a decontaminate solution or water and surfactants. Also employed is a time delayed color developing system. When an individual is subjected to the PCASS and does not decontaminate adequately, red blotches or red coloration will develop as a function of time and temperature. The intent of this is to simulate the delayed chemical reaction of mustard contaminates. B.W.

N85-26939# Pennsylvania State Univ., University Park.
SECONDARY ION MASS SPECTROMETRY STUDIES OF SOLIDS AND SURFACES Final Report, 1 Nov. 1983 - 31 Oct. 1984
N. Winograd 17 Jan. 1985 15 p
(Grant AF-AFOSR-0057-82)
(AD-A151744; AFOSR-85-0228TR) Avail: NTIS HC A02/MF A01 CSCL 07/4

We have recently completed construction of an energy- and angle-resolved detector for neutral particles desorbed from ion bombarded surfaces. It is based on a time-of-flight measurement for the neutral energies, multiphoton resonance ionization (MPRI) for the angular information. Using this detector, we have initiated a series of experiments aimed at determining the energy and angular distributions of the Rh atoms ejected from clean and adsorbate covered polycrystalline and single crystal surfaces. From the polycrystalline material, we find the velocity distribution of Rh atoms follows closely the form predicted by Thompson with a peak intensity occurring at approximately 5 eV and a high energy tail decreasing in intensity as E-2. Polar angle distributions exhibit nearly a cos2 shape. From a Rh(001) crystal, the velocity distribution generally peaks at higher value than that found from the polycrystalline surface, and depends strongly on the value of the polar collection angle. In addition to energy distribution measurements into a given angle, we are able to extract angular distribution measurements into a given azimuth from Rh(001) show three peaks of preferred ejection angles. GRA

N85-26940# Ohio State Univ., Columbus. Electroscience Lab.
AN ATLAS OF PURE WATER VAPOR SPECTRA FROM 500 TO 5000/CM, VOLUME 2
R. K. Long and E. K. Damon Sep. 1984 452 p 2 Vol.
(Contract DAAG29-81-K-0084)
(AD-A151757; ESL-713774-3-Vol-2; ARO-17603.4-GS) Avail: NTIS HC A20/MF A01 CSCL 07/4

An atlas of the pure H2O absorption spectrum between 500 and 5000 cm-1 is presented. For each frequency, four spectra are presented, from top to bottom: 5 Torr at 284 k; 10 Torr at 294.3 k; 20 Torr at 308 k; and 40 Torr at 320 k. Tables of approximate line frequencies are also included. Volume 1 (AD-A151756) contains spectral plots. This volume contains the line listing. GRA

N85-26941# Ballistic Research Labs., Aberdeen Proving Ground, Md.
DESIGN OF A MOBILE COMBUSTION DIAGNOSTIC FIXTURE (MCDF) Final Report
D. Devynck Nov. 1984 51 p
(DA Proj. 1L1-61102-AH-43)
(AD-A151814; AD-F300584; BRL-MR-3412) Avail: NTIS HC A04/MF A01 CSCL 21/2

A Mobile Combustion Diagnostic Fixture (MCDF) has been designed. This fixture is intended to be used in connection with chemical diagnostic techniques in order to provide data on the phenomena involved in the ignition process of the propelling charge a gun. Special care has been taken of the safety of operation of the fixture. GRA

N85-26942# Princeton Combustion Research Labs., Inc., N.J.
ANALYSIS OF COMBUSTION OSCILLATIONS IN HETEROGENEOUS SYSTEMS Final Report, 15 Mar. 1982 - 15 Mar. 1984
M. Ben-Reuven May 1984 97 p
(Contract F49620-82-C-0062)
(AD-A151999; PCRL-FR-84-002; AFOSR-85-0250TR) Avail: NTIS HC A05/MF A01 CSCL 21/2

This study is aimed at elucidation of the physical mechanisms capable of driving acoustic instability in solid propellant rocket motors, of the type termed velocity-coupled instability. The first and second tasks of this research, Critical Literature Review, and Order of Magnitude Analyses of velocity-coupling mechanisms, have been reported earlier. The third part of the study, Analytical Simulation of the Interior Flowfield Within a Solid Propellant Grain, is reported herein. The subject of the present analysis is simulation of the cold-flow experiments by Dr. Brown at UTC/CSD, in which nitrogen is injected through the porous sidewalls of a cylindrical pipe, creating an internal axisymmetric flow field. A comprehensive analytical model of the nonsteady flow processes entails a system of four partial differential equations for continuity, radial and axial momentum and thermal enthalpy. The flowfield is considered compressible and viscous, with all of the dissipative terms included. A focal point of the analysis has been the thin viscous sublayer adjacent to the porous surface, where visco-acoustic interactions occur. GRA

N85-26943# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

OPTOGALVANIC MEASUREMENT OF EVEN PARITY RYDBERG LEVELS IN KRYPTON GAS M.S. Thesis
M. S. Kandola Dec. 1984 61 p
(AD-A152113; AD-E401303; AFIT/GEO/PH/84D-2) Avail: NTIS HC A04/MF A01 CSCL 07/4

An optogalvanic detection scheme, in conjunction with a single-step pulsed laser excitation has been used to measure the energy of even parity Rydberg levels in krypton. The excitation scheme starts from the 5s(3/2)2 and 5s'(1/2)0 metastable states, which have been populated in a He-Kr discharge tube. Measured energies were compared to either calculated or previously measured values. Calculated energies were obtained with the Rydberg formula using quantum defects extrapolated from the known low-lying levels. GRA

N85-26944# Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE OVERALL REACTION CONCEPT IN PREMIXED, LAMINAR, STEADY-STATE FLAMES. 2: INITIAL TEMPERATURES AND PRESSURES Final Technical Report
T. P. Coffee, A. J. Kotlar, and M. S. Miller Nov. 1984 29 p
(AD-A152132; AD-F300546; BRL-TR-2605-2) Avail: NTIS HC A03/MF A01 CSCL 21/2

In a previous report, we examined the adequacy of the overall reaction model for premixed, laminar, one-dimensional, steady-state flames. The single reaction model gave quite accurate results for burning velocity. The temperature and heat release profiles were also generally accurate. The accuracy of the major species profiles varied from fair to good. However, the optimal overall kinetic parameters varied with the equivalence ratio. In this report, the adequacy of an overall reaction model for premixed, laminar, one-dimensional, steady-state flames is examined for variations in initial temperature and pressure. The single reaction model gives quite accurate results for burning velocity; temperature and heat release profiles are also generally accurate; major species profiles are reproduced with fair to good accuracy. The optimal overall parameters change with initial temperature and pressure. However, a single set of parameters are found to be accurate over a limited range of initial temperatures and pressures. GRA

N85-26945# California Univ., Irvine.
TRANSFORMATION OF NITROGEN OXIDES WHILE SAMPLING COMBUSTION PRODUCTS Final Report, Sep. 1978 - Dec. 1983
J. W. Grove and G. S. Samuelsen Tyndall AFB, Fla. Air Force Engineering and Services Center Feb. 1985 23 p
(Grant AF-AFOSR-3586-78)
(AD-A152184; UCI-ARTR-84-8; AFESC/ESL-TR-84-41) Avail: NTIS HC A02/MF A01 CSCL 21/2

The objective of the program was to assess the condition under which transformations of nitrogen oxides (NO and NO2) may occur in an extractive probe used to sample exhaust gases from combustor sources such as gas turbine engines and boilers. The approach was to use simulated combustion products in a controllable laboratory experiment. Trials were run using 2-meter (79-inch) long, 6.35 mm (0.25-inch) OD tubing. Tubing materials considered included type 316 stainless steel, quartz, inconel, and nickel. Various gaseous compositions, including those representative of gas turbine exhausts, were evaluated for various tempera-,tures over a range (150 C to 400 C) typical of the temperatures experienced by probe materials in practical systems. NOx is conserved in 316 stainless steel and quartz tubes up to 400 C. Above 400 C, NOx can be destroyed. GRA

N85-26946# New York Univ., New York. Dept. of Chemistry.
IONIZATION ENERGIES OF LIQUIDS FROM ENERGY DISTRIBUTION, QUANTUM YIELD AND SECOND DERIVATIVE CURVES
K. P. Cheung, I. Watanabe, A. Dziedzic, K. von Burg, and P. Delahay Mar. 1985 27 p
(Contract N00014-82-K-0113)
(AD-A152210; NYU/DC/TR-7-New Series-2) Avail: NTIS HC A03/MF A01 CSCL 20/8

The energies of the lowest ionization band of eight liquids of low vapor pressure are determined from energy distribution curves (EDC), quantum yield spectra (collected electrons per incident photon as a function of photon energy), and second derivative curves (SDC) of retarding potential curves. Threshold energies from EDC's and quantum yield spectra agree if one takes into account a 0.15 eV shift caused by the spectrometer's rather low resolution and a small difference (0.15 eV or less) resulting from the use of approximate extrapolation methods. Threshold energies from EDC's and SDC's agree to within 0.1 eV after correction for the half-width of the high-energy branch of SDC's. Multiple ionization bands are exhibited by the SDC's of some of the liquids, and the observed splittings agree well with the results from gas-phase UPS spectra. A new spectrometer for the measurement of EDC's of liquids is described. The liquids studied are 6-chloro-1-hexanol, 2-ethyl-1-hexanol, ethylene cyanohydrin, ethylene glycol, 1,5-pentanediol, tetraglyme, triethylene glycol, tetraethylene glycol. GRA

N85-26947# Union Carbide Corp., Tarrytown, N.Y.
IMPROVED CATALYSTS FOR LIQUID HYDROCARBON FUELS FROM SYNGAS Quarterly Technical Progress Report, Sep. - Dec. 1984
1984 17 p
(Contract DE-AC22-84PC-70028)
(DE85-006569; DOE/PC-70028/T1; QTPR-1) Avail: NTIS HC A02/MF A01

The objective of this research is to consolidate the advances already made in the conversion of syngas to motor fuels using Molecular Sieve containing catalysts and to demonstrate the practical utility and economic value of the new catalyst/process systems with appropriate laboratory runs. Work on the program is divided into the following six tasks: (1) preparation of a detailed work plan covering the entire performance of the contract; (2) techno-economic studies that will supplement those that are presently being carried out; (3) optimization of the most promising catalysts already developed; (4) optimization of the UCC catalyst system in a manner that will give it the longest possible service life; (5) optimization of a process/catalyst system based upon a tubular reactor with a recycle loop containing the most promising catalyst developed under Tasks 3 and 4 studies; and (6) economic evaluation of the optimal performance found under Task 5 for the UCC process/catalyst system. DOE

N85-26948# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Mechanical Engineering.
LDA STUDY OF NON-STEADY FLAME PROPAGATION IN A CONSTANT VOLUME DUCT
D. Dunn-Rankin, R. K. Cheng, and R. F. Sawyer Sep. 1984 22 p refs Presented at 2nd Intern. Symp. on Appl. of Laser Anemometry to Fluid Mech., Lisbon, 2 Jul. 1984
(Contract DE-AC03-76SF-00098)
(DE85-007233; LBL-18150; CONF-840753-2) Avail: NTIS HC A02/MF A01

The development of tulip shaped flames during laminar flame propagation in a closed duct was investigated. The interaction of a laminar flame front with its self-induced nonsteady flow field is examined as a possible source of the tulip phenomenon. ,The flame generated flow is measured with a laser Doppler anemometer (IDA). The flame shape and its position are recorded with high-speed schlieren cinematography. Comparison of the qualitative schlieren and the quantitative LDA data records provides insight into the flame/flow relationship. DOE

N85-26949# Rochester Univ., N. Y.
TRANSITIONAL METAL ACTIVATION AND FUNCTIONALIZATION OF C-H BONDS Progress Report, 1 Jun. 1984 - 31 May 1985
W. D. Jones Feb. 1985 13 p refs
(Contract DE-AC02-83ER-13095)
(DE85-006816; DOE/ER-13095/T1) Avail: NTIS HC A02/MF A01

The mechanism and thermodynamics of alkane and arene C-H bond activation has been investigated by the reactive intermediate

[(C5Me5)Rh(PMe2R)], where R = benzyl or propyl. Earlier studies showed that arene activation occurs by way of initial coordination in a dihapto fashion. Kinetically, intermolecular alkane activation competes with arene activation, whereas arene activation is favored thermodynamically by 7 kcal/mole. In the most recent studies, the intramolecular activation of C-H bonds of alkyl and aryl groups is found to compete kinetically with intermolecular activation of neat solvent. The difference between the intra and intermolecular entropies of activation is not found to be a significant factor in determining intra vs intermolecular reaction. Thermodynamically, intramolecular activation is found to be favored. DOE

N85-26950# Bendix Corp., Kansas City, Mo.
PULSED ELECTRODEPOSITION Final Report
C. J. Stimetz Feb. 1985 47 p refs
(Contract DE-AC04-76DP-00613)
(DE85-007057; BDX-613-3179) Avail: NTIS HC A03/MF A01

Pulse plating of cobalt-hardened gold alloys increases the cobalt content in the alloy. At lower duty cycles, the electrodeposits become dull. Little change in the microhardness was observed between pulsed and direct current electrodeposits. The TEM and electron diffraction analyses indicated no significant difference in microstructure between pulsed and conventional gold alloy electrodeposits. Pulse plated and conventional nickel deposits have been compared for differences in morphology, mechanical properties, and microstructure. The deposits were obtained from nickel sulfamate, nickel chloride, and Watts nickel plating solutions. No significant differences were found in the direct and pulse current deposits from the sulfamate and chloride solutions; however, significant differences in microstructure, yield strength, and microhardness were observed in deposits from the Watts nickel solution. DOE

N85-26951# Oak Ridge Y-12 Plant, Tenn.
FOURIER TRANSFORM INFRARED SPECTROPHOTOMETRIC ANALYSIS OF RESIN MIX STOICHIOMETRY, REVISION 1
R. D. Seals, C. S. MacDougall, and E. E. Johnson 19 Mar. 1985 20 p ref
(Contract DE-AC05-84OS-21400)
(DE85-007272; Y/DW-480-Rev-1) Avail: NTIS HC A02/MF A01

A Fourier transform infrared (FTIR) spectrophotometric procedure was developed for routine in-process certification of the stoichiometry of the DER-332/T-403 resin system. The method is specific for each component and includes measurement of absorbances at 1108.5 cm(-1) (T-403) and 1609.4 cm(-1) (DER-332). After subtracting background and component interferences the absorbance values are ratioed and the ratio (R) is compared with standard values to obtain a calibration equation for determining resin stoichiometry. The FTIR procedures have user-prompting computer control to provide calibration and accept/reject criteria for in-process quality control sample analysis. This is one of the first applications of quantitative FTIR for in-process analysis. DOE

N85-26952# California Univ., Livermore. Lawrence Livermore Lab. Analytical Chemistry Section.
BOUND AND FREE MOISTURE STUDIES OF SOLID MATERIALS BY FTNMR
Raymond L. Ward, James A. Happe, and James W. Pyper Nov. 1984 15 p refs Presented at the Intern. Symp. on Moisture and Humidity, Washington, D.C., 15-19 Apr. 1985
(Contract W-7405-eng-48)
(DE85-003227; UCRL-91758; CONF-850441-2) Avail: NTIS HC A02/MF A01

Proton nuclear magnetic resonance was used to study the moisture content of a number of solids: Triaminotrinitrobenzene (TATB) and its plastic bonded Kel-F derivatives, Kevlar, aerogel, and Teflon. Most of the studies were with TATB which exhibits a broad 40kHz Pake doublet with a superimposed narrow water peak. Under high resolution the water peak can often be resolved into two peaks. A similar doublet was observed with Kevlar and aerogel. Whereas the line widths of the doublet vary from 70 to 1000 Hz depending on the material. The chemicl shift is constant at ca. 2.5 ppM. At least one line in TATB was identified as water by examining samples that took up varying amounts of moisture from humid air. Variable temperature studies were performed on a number of samples with differing results. The water of TATB does not freeze-out down to -60(0)C and does not narrow until +105(0)C, whereas the Kevlar doublet does not change on heating to 140(0)C. Aerogel exhibits the water doublet plus a third narrow peak which are lost upon heating to 70(0)C. Upon exposure to the atmosphere all three peaks return in almost the proportion. DOE

N85-26953# California Univ., Livermore. Lawrence Livermore Lab.
IN SITU MICROWAVE MEASUREMENTS OF DIELECTRIC PROPERTIES AND MOISTURE IN MATERIALS
V. R. Latorre and R. J. King Sep. 1984 9 p refs Presented at Moisture and Humidity Symp., Washington, D.C., 15 Apr. 1985
(Contract W-7405-eng-48)
(DE85-003622; UCRL-91553; CONF-850441-1) Avail: NTIS HC A02/MF A01

The accurate nondestructive evaluation of dielectric properties of materials is important for quality control, safety, liability, and economic reasons. A significant problem is the determination of water content in low-loss dielectric materials, since the presence of water will notably alter the value of the materials' permittivity and physical properties. An open-ended coaxial resonator incorporated in a microwave homodyne detection system may be used to measure changes in its resonant frequency and quality factor resulting from changes in permittivity and hence water content. Such a system is described and results that prove it is capable of measuring water content in reference samples to less than 100 parts per million (ppM) are presented. System improvements are also described which will result in measurement accuracies of less than 50 ppM water in low-loss dielectric materials. DOE

N85-26954# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
ON THE ANALYTIC CALCULATION OF PREMIXED FLAMES
H. F. R. Schoeyer and J. H. Vandijk Dec. 1983 90 p refs
(VTH-LR-417) Avail: NTIS HC A05/MF A01

A method for the analytic calculation of temperature, concentration, and velocity profiles in premixed flames is presented. The method assumes that heat transfer is only a determining factor at the cold boundary, and that the temperature rise in the major portion of the flame is a linear function of the relative concentration of reactants. A simple quadrature for the temperature can be derived which is related to the location where that temperature is reached. The combustion has to be described by an overall arbitrary order Arrhenius reaction, but there are no restrictions on the value of the stoichiometric coefficient. The method also immediately reveals the effect of parameters such as pressure, pre-exponential factor, stoichiometric coefficient, and molar mass on the temperature profile. Results were verified using the results of a numerical integration of the differential equations describing the flame. Author (ESA)

N85-26955# Southern Research Inst., Birmingham, Ala.
ANALYTICAL METHODS FOR DETERMINATION OF POHC (PRINCIPAL ORGANIC HAZARDOUS CONSTITUENTS) IN COMBUSTION PRODUCTS Report, Jun. 1983 - Feb. 1984
R. E. Adams, R. H. James, L. A. Burford, H. C. Miller, and L. D. Johnson (EPA, Research Triangle Park, N.C.) Feb. 1985 31 p refs
(Contract EPA-68-02-3696)
(PB85-161578; EPA-600/M-85-006) Avail: NTIS HC A03/MF A01 CSCL 07D

An overview is given of generalized analytical procedures for determining designated principal organic hazardous constituents (POHCs) in combustion products; it also gives some examples of the techniques used for compounds such as 2,3,7,8-tetrachlorodibenzodioxin, selenourea, and several organo-arsenicals. Emissions from hazardous-waste combustion must be monitored to determine the destruction removal efficiency (DRE) for each designated POHC. Analytical methods for more than

150 POHCs have been reviewed. A generalized HRGC/LRMS method to determine volatile, thermally stable POHCs has been developed. A method based on HPLC with UV detection has also been developed to provide an alternative for determining nonvolatile or thermally labile compounds. Author (GRA)

N85-26909*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
IGNITION/COMBUSTION PROCESSES Abstract Only
D. E. Pryor *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 694-695 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 21B

N85-26911*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.
LASER SCHLIEREN AND ULTRAVIOLET DIAGNOSTICS OF ROCKET COMBUSTION
S. C. Fisher *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 717-731 (For primary document see N85-26862 16-20)
(Contract NAS8-34728)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 21B

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N85-26956 Polish Academy of Sciences, Warsaw. Dept. of Construction Theory.
ESTIMATION OF THE DEPTH OF A SPHERICAL CAP IN AN HYDRAULIC DRAWING TEST FOR SOME SIMPLE CONDITIONS OF LOSS OF STABILITY [OSZACOWANIE WYSOKOSCI CZASZY KULISTEJ W PROBIE HYDRAULICZNEGO WYTLACZANIA DLA NIEKTORYCH PROSTYCH WARUNKOW UTRATY STATECZNOSCI]
Zdzislaw Sloderbach and Tadeusz Sawicki 1984 30 p refs In POLISH
(Rept-4/1984; ISSN-0208-5658) Avail: Issuing Activity

An analytic determination is provided of the depth of spherical cap h for four simple cases of loss of stability in a hydraulic drawing test. The greatest depth (maximum distortion) is achieved under conditions of instability from shearing, and the least depth, under conditions of maximum pressure. The increase in the coefficient of anisotropy is shown to cause an increase in depth in a hydraulic drawing test for all four conditions of stability loss. The coefficient of anisotropy causes an elongation of the plasticity ellipse, which can increase tension and the possibility of deformation. For high values of normal anisotropy, the fourth condition of stability loss yields geometrically unacceptable results.
Transl. by B.G.

N85-26957 British Library Lending Div., Boston Spa (England).
DETERMINATION OF PERMISSIBLE HEATING RATE OF METAL
P. G. Krasnokutskii, V. A. Krivandin, V. D. Olyak, and V. I. Bezrukov 23 Jan. 1984 8 p refs Transl. into ENGLISH from Izv. VUZ Chern. Met. (USSR), v. 7, 1984 p 115-119
(BLL-M-36107-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

With the aim of eliminating the possibility of excessive temperature stresses arising in metal when high-speed methods of heating are used, an examination was made of the permissible densities of heat flows for heated bodies. In calculations, parameters of the boundary conditions varied within ranges acceptable for forging and rolling heating furnaces with semi-continuous and continuous heating conditions. The three-dimensional problem was solved for parallelepipeds of steels 20 and 1Kh18N9T with account taken of the thermal properties of the metal and the cross-sectional dimensions of the steel. Author

N85-26958 British Library Lending Div., Boston Spa (England).
DUCTILITY EQUATION FOR POROUS METALS AND ITS LINEARIZATION
A. I. Rudskoi and A. A. Grigorev 23 Jan. 1984 5 p refs Transl. into ENGLISH from Izv. VUZ Chern. Met., vol. 7, 1984 p 151-152
(BLL-M-36118-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The procedure for linearizing the ductility equation for porous sintered metal is presented. The linearized equation can be used for elementary solution of main technological problems of the theory of mechanical working of metals. Metal working such as rolling, setting and unsetting. Author

N85-26959 British Library Lending Div., Boston Spa (England).
DISSOLUTION OF SOLID SOLUTIONS IN ABSENCE OF INTERNAL MASS TRANSFER
Yu. V. Pokhvisnev and A. A. Shatov 23 Jan. 1984 5 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Chernaya Met. (USSR), no. 7, 1984 p 11-13
(BLL-M-36092-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A study was made of the kinetics of dissolution of binary metallic alloys in liquid. The saturated concentrations of the components of iron manganese alloys in liquid zinc at a temperature of 600 C in conditions of natural convection were determined experimentally. The rates of dissolution of the components of copper nickel alloys in nitric acid at 22 C were studied by the rotating disc method. Results confirm that the rate of dissolution depends on the activities of components in the surface layer rather than inside the solid solution. Author

N85-26960 British Library Lending Div., Boston Spa (England).
STRUCTURAL INHOMOGENEITIES IN AMORPHOUS NICKEL-PHOSPHORUS ALLOY
S. K. Krysova, V. V. Naberezhnykh, and I. N. Moshenskaya 23 Jan. 1984 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Chernaya Met. (USSR), no. 7, 1984 p 92-94
(BLL-M-36103-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Low angle X ray scattering was used to study evolution of structural inhomogeneities, microhardness, and density during low temperature annealing of amorphous alloys Ni80P20 and Ni75P25 produced by electrodeposition. The temperature of solidification of the given alloys was determined by differential thermal analysis. Two sizes of electron density inhomogeneity were found in the newly deposited alloys. Relaxation processes were found to proceed more intensively in alloy Ni80P20, while alloy Ni75P25 has the higher stability in relation to solidification temperature.
Author

N85-26961*# Johns Hopkins Univ., Baltimore, Md. Center for Materials Research.
MICROSTRUCTURES AND PROPERTIES OF RAPIDLY SOLIDIFIED ALLOYS Progress Report
D. Shechtman and E. Horowitz Jul. 1984 39 p
(Grant NAG1-399)
(NASA-CR-172377; NAS 1.26:172377) Avail: NTIS HC A03/MF A01 CSCL 11F

The microstructure and properties of rapidly solidified aluminum alloys were researched. The effects of powder and flake chemistry and morphology and alternative consolidation processing parameters are being conducted. Samples of the powders being utilized were obtained for comprehensive metallurgical characterization. Seven aluminum alloys in the form of thin foils were studied by a variety of techniques including optical metallography, scanning electron microscope, and transmission electron microscope. Details of the microstructural characteristics are presented along with a discussion of the solidification process. A better understanding of the microstructure of the rapidly solidified aluminum alloys prepared by a variety of techniques such as roller quenching, the vacuum atomized procedure, ultrasonically atomized in inert atmospheres, and atomized in flue gas was provided. B.G.

N85-26962*# Connecticut Univ., Storrs.
IRON RICH LOW COST SUPERALLOYS Ph.D. Thesis. Final Report
Steven F. Wayne Cleveland May 1985 169 p refs
(Grant NAG3-271)
(NASA-CR-174900; NAS 1.26:174900) Avail: NTIS HC A08/MF A01 CSCL 11F

An iron-rich low-cost superalloy was developed. The alloy, when processed by conventional chill casting, has physical and mechanical properties that compare favorably with existing nickel and cobalt based superalloys while containing significantly lower amounts of strategic elements. Studies were also made on the properties of Cr(20)-Mn(10)-C(3.4)-Fe(bal.), a eutectic alloy processed by chill casting and directional solidification which produced an aligned microstructure consisting of M7C3 fibers in a gamma-Fe matrix. Thermal expansion of the M7C3 (M = Fe, Cr, Mn) carbide lattice was measured up to 800 C and found to be highly anisotropic, with the a-axis being the predominant mode of expansion. Repetitive impact sliding wear experiments performed with the Fe rich eutectic alloy showed that the directionally solidified microstructure greatly improved the alloy's wear resistance as compared to the chill cast microstructure and conventional nickel base superalloys. Studies on the molybdenum cementite phase prove that the crystal structure of the xi phase is not orthorhombic. The crystal structure of the xi phase is made up of octahedra building elements consisting of four Mo and two Fe atoms and trigonal prisms consisting of four Fe and two Mo atoms. The voids are occupied by carbon atoms. The previous chemical formula for the molybdenum cementite MoFe2C is now clearly seen to be Mo12Fe22C10. Author

N85-26963*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PROPERTIES AND MICROSTRUCTURES FOR DUAL ALLOY COMBINATIONS OF THREE SUPERALLOYS WITH ALLOY 901
Fredric H. Harf 1985 43 p refs Presented at the 114th Ann. Meeting of the Am. Inst. of Mining, Met. and Petroleum Engr., New York, 24-28 Feb. 1985
(NASA-TM-86987; E-2397; NAS 1.15:86987) Avail: NTIS HC A03/MF A01 CSCL 11F

Dual alloy combinations have potential for use in aircraft engine components such as turbine disks where a wide range of stress and temperature regimes exists during operation. Such alloy combinations may directly result in the conservation of elements which are costly or not available domestically. Preferably, a uniform heat treatment yielding good properties for both alloys should be used. Dual alloy combinations of iron rich Alloy 901 with nickel base superalloys Rene 95, Astroloy, or MERL 76 were not isostatically pressed from prealloyed powders. Individual alloys, alloy mixtures, and layered alloy combinations were given the heat treatments specified for their use in turbine disks or appropriate for Alloy 901. Selected specimens were overaged for 1500 hr at 650 C. Metallographic examinations revealed the absence of phases not originally present in either alloy of a combination. Mechanical tests showed adequate properties in combinations of Rene 95 or Astroloy with Alloy 901 when given the Alloy 901 heat treatment. Combinations with MERL 76 had better properties when given the MERL 76 heat treatment. The results indicate that these combinations are promising candidates for use in turbine disks. Author

N85-26964*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MULTIAXIAL AND THERMOMECHANICAL FATIGUE CONSIDERATIONS IN DAMAGE TOLERANT DESIGN
Gail E. Leese (TRW, Inc., Cleveland) and Robert C. Bill 1985 21 p refs Presented at the 60th Meeting of the Struct. and Mater. Panel, San Antonio, 21-26 Apr. 1985; sponsored by AGARD Prepared in cooperation with Army Research and Technology Labs., Cleveland
(NASA-TM-87022; E-2514; NAS 1.15:87022; USAAVSCOM-TR-85-C-5) Avail: NTIS HC A02/MF A01 CSCL 11F

In considering damage tolerant design concepts for gas turbine hot section components, several challenging concerns arise: Complex multiaxial loading situations are encountered; Thermomechanical fatigue loading involving very wide temperature ranges is imposed on components; Some hot section materials are extremely anisotropic; and coatings and environmental interactions play an important role in crack propagation. The effects of multiaxiality and thermomechanical fatigue are considered from the standpoint of their impact on damage tolerant design concepts. Recently obtained research results as well as results from the open literature are examined and their implications for damage tolerant design are discussed. Three important needs required to advance analytical capabilities in support of damage tolerant design become readily apparent: (1) a theoretical basis to account for the effect of nonproportional loading (mechanical and mechanical/thermal); (2) the development of practical crack growth parameters that are applicable to thermomechanical fatigue situations; and (3) the development of crack growth models that address multiple crack failures. Author

N85-26965# METECH, Inc., Elverson, Pa.
THE REPLACEMENT OF PRECIOUS METAL THICK FILM INKS USING CONDUCTIVE POLYMER TECHNOLOGY
R. K. Selwood, G. Rosenberger, and A. Zelinski 28 Feb. 1985 15 p
(Contract N00014-84-C-0697; ARPA Order 4941)
(AD-A152002) Avail: NTIS HC A02/MF A01 CSCL 11/6

Thick film hybrid electronics using precious metals such as gold, silver, and the platinum group are an integral part of the processing of most electronic components. The high intrinsic cost and strategic nature of these materials present natural motivation for investigation into alternative technologies that could reduce or eliminate them. The purpose of this work was to evaluate the feasibility of incorporating current and future synthetic metals into thick film technology for electronic and aerospace applications. The work carried out in this study included a literature review to identify available potential synthetic metal candidates. This included discussions with researchers active in this program. Herein is a brief discussion of thick film technology and the potential utilization of synthetic metals. Also included are preliminary test results on several prototype synthetic metal thick film materials. Evaluations were carried out based on conductivity, short-term stability, adhesion, and tractability. Initial observations indicate may technical obstacles to practicality. However, the overall results were considered encouraging, and sufficient feasibility was demonstrated to warrant further study. GRA

N85-26966# Naval Surface Weapons Center, White Oak, Md.
PRODUCTION OF SHAPED PARTS OF NITINOL ALLOYS BY SOLID-STATE SINTERING
D. M. Goldstein 15 Oct. 1984 32 p
(F66-512)
(AD-A152089; NSWC/TR-84-326) Avail: NTIS HC A03/MF A01 CSCL 11/6

NITINOL is an alloy of nickel and titanium which exhibits a shape memory effect. The term shape memory effect (SME) is used to describe the ability of certain alloys which, if deformed at a low temperature, will recover their prior shape when heated. A solid state sintering process has been successfully adapted to consolidating NITINOL alloy powders. NITINOL alloys are noted for their shape memory properties. The sintering process is performed at atmospheric pressure upon powders contained in an evacuated glass container. Processing parameters are reported. Tubes and tubular tees were made as well as solid round bars. Round bar stock was extruded and swaged. Excellent shape memory properties were obtained. GRA

N85-26967# Naval Surface Weapons Center, White Oak, Md.
EFFECT OF NICKEL ADDITION ON THE THERMAL, MAGNETIC AND MAGNETOMECHANICAL PROPERTIES OF Fe(80)B(15)Si(5)
L. T. Kabacoff and M. Wun-Fogle 2 Jul. 1984 19 p
(AD-A152281; NSWC/TR-84-294) Avail: NTIS HC A02/MF A01

CSCL 11/6

Fe-based metallic glasses with about 20 a/o metalloid (B, Si, and sometimes C) possess very high magnetomechanical coupling factors when properly field annealed. However, the corrosion resistance is very poor, leading to rust formation if left in air for a few weeks or months. Additions of Ni promote improved resistance to corrosion, but would be expected to degrade the magnetostriction somewhat. This report evaluates the effect of Ni additions on some thermal, magnetic and magnetomechanical properties of a typical high coupling metallic glass. The Curie temperatures (T sub c), magnetomechanical coupling factors (K sub 33), anisotropy fields (H sub A), and crystallization temperatures (T sub x) of the series of metallic glasses, Fe80-x NixB15Si5 (0 less than x less than 40), were measured. The values of T sub c were determined from the specific heat anomaly using a differential scanning calorimeter. K sub 33 was determined by a resonance technique. H sub A was estimated from the bias field which yields a minimum in resonance frequency (I.e., minimum Young's modulus). T sub x, defined by the onset of crystallization, was also measured by DSC, at a heating rate of 20 C/min. GRA

N85-26968# Rockwell International Corp., Golden, Colo.
MATERIAL FOR PROTECTION OF METAL SURFACES AGAINST CORROSION BY MOLTEN SALTS
Feb. 1985 5 p Transl. into ENGLISH of French Patent no. 2,355,788 (1978)
(Contract DE-AC04-76DP-03533)
(DE85-007714; RFP-Trans-436) Avail: NTIS HC A02/MF A02

This material consists of at least one ceramic material having an expansion coefficient close to the expansion coefficient of the metal surface to be protected, the said ceramic material being ultimately eliminable when the said metal surfaces are no longer in contact with the molten salts. The ceramic material consists of an oxide or of a mixture of oxides selected from the group comprising silica, zircon, alumina and meta-kaolin. The ceramic material is used in the form of a plastic mixture. Also the ceramic material is used in the form of a compact baked part, having the shape of the surface to be protected. The material may be used for protection of the internal lubricant flow ducts close to the cutting parts of a drilling tool, during immersion of the said drilling tool in a bath of molten salts. DOE

N85-26969# Rice Univ., Houston, Tex. Dept. of Materials Science.
STUDY OF THE KINETICS AND THERMODYNAMICS OF HYDROGEN IN Pd-BASED ALLOYS
R. B. McLellan 1985 4 p refs
(Contract DE-FG05-84ER-45075)
(DE85-007341; DOE/ER-45075/1) Avail: NTIS HC A02/MF A01

Theoretical analyses of experiments on H in Pd-M (M = Cu, Au, Ag, Rh) have been completed. Experiments have also been carried out in which Ni is used instead of a noble metal. New experiments have been initiated on Pd-Pt-H systems. New work has also been initiated on the effect of monovacancy traps of the H diffusivity in noble metals. DOE

N85-26970# Science Applications, Inc., Rockville, Md.
LPCVD TUNGSTEN DEPOSITION ON Si-Ge ALLOY
R. A. Rossmeisl, V. A. Wells (Sandia Labs., Albuquerque, N. Mex.), and R. J. Walko (Sandia Labs., Albuquerque, N. Mex.) 1984 15 p Presented at the Workshop on Tungsten for VLSI Appl., Albuquerque, N. Mex., 12 Nov. 1984
(Contract DE-AC04-76DP-00789)
(DE85-005588; SAND-84-22670; CONF-8411141-1) Avail: NTIS HC A02/MF A01

The Radioisotope Thermoelectric Generator (RTG) consists of a heat source, an 80/20 Si-Ge thermopile, MIN-K insulation, and a stainless steel container. The dc diode sputtered tungsten bridges interconnect alternate wafers in the thermopile. The diffusion of silicon into the tungsten interconnects appears to be the cause of a sudden increase in contact resistance after a period of time. The low pressure chemical vapor deposition (LPCVD) technique is compared with sputtering for this reason. LPCVD is found to be simpler than sputtering, self-cleaning, and not prone to damage the surface as does sputtering. Aging profiles are found to tend toward the high end of the acceptance window. DOE

N85-26971# Massachusetts Inst. of Tech., Cambridge.
RAPID SOLIDIFICATION OF CANDIDATE FERRITIC STEELS
J. Mequsar, C. A. Craven, G. Kohse, O. K. Harling, and J. Runkle Jan. 1985 6 p refs
(Contract DEAC02-78ER-10107)
(DE85-006596; DOE/ES-10107/25) Avail: NTIS HC A02/MF A01

HT-9 and 9Cr-1Mo steels were rapidly solidified by the liquid dynamic compaction process and 2-1/4Cr-1Mo steel was prepared by the ultrasonic gas atomization process. The consolidation was performed in the ferritic temperature range in order to minimize segregation. These alloys will be tested at ORNI using 1/3 CVN test specimens and the results will be compared with those for conventionally processed alloys. DOE

N85-26972# Los Alamos Scientific Lab., N. Mex.
SOLUTION SOFTENING IN MOLYBDENUM-RHENIUM ALLOYS
L. B. Lundberg, E. K. Chriner, S. M. Tuominen, and E. P. Whelan 1984 23 p refs Presented at the Phys. Metal. and Technol. of Molybdenum and its Alloys, Ann Arbor, Mich., 29 Oct. 1984
(Contract W-7405-eng-36)
(DE85-006706; LA-UR-85-288; CONF-8410221-2) Avail: NTIS HC A02/MF A01

This study has clearly demonstrated the solution softening phenomenon in Mo-Re alloys that contain 5.8 to 8.2 at. % Re. The intrinsic nature of the phenomenon tends to be supported by this work; however, the addition of rhenium to molybdenum appears to cause a redistribution of interstitials that affects the fracture behavior in worked alloys. Much more fundamental research is needed to clearly establish the mechanisms that cause this phenomenon. The fabrication of these alloys seems to be no more difficult than any molybdenum alloys produced commercially today. Even the control of rhenium content in the maximum solution softening range does not appear to be difficult. DOE

N85-26973# Oak Ridge National Lab., Tenn. Solid State Div.
PARAMAGNETIC FORM FACTORS FROM ITINERANT ELECTRON THEORY
J. F. Cooke, S. H. Liu, and A. J. Liu Sep. 1984 13 p refs Presented at the 30th Ann. Conf. on Magnetism and Magnetic Mater., San Diego, Calif., 27-30 Nov. 1984
(Contract DE-AC05-84OR-21400)
(DE85-005272; CONF-841184-30) Avail: NTIS HC A02/MF A01

Elastic neutron scattering experiments performed over the past two decades have provided accurate information about the magnetic form factors of paramagnetic transition metals. These measurements have traditionally been analyzed in terms of an atomic like theory. There are, however, some cases where this procedure does not work, and there remains the overall conceptual problem of using an atomistic theory for systems where the unpaired spin electrons are itinerant. Computer codes have been developed for efficiently evaluating the induced magnetic form factors of fcc and bcc itinerant electron paramagnets. Results for the orbital and spin contributions have been obtained for Cr, Nd, V, No, Pd and Rh based on local density bands. By using calculated spin enhancement parameters, reasonable agreement was found between theory and neutron form factor data. In addition, these zero parameter calculations yield predictions for the bulk susceptibility on an absolute scale which are in reasonable agreement with experiment in all treated cases except palladium. DOE

N85-26974# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
CHARACTERISTICS OF POLYACRYLIC ACID-COMPLEXED ZINC PHOSPHATE CONVERSION FILMS DEPOSITED ON METAL SURFACES
Toshifumi Sugama, Lawrence E. Kukacka, and Neal Carciello 1984 8 p refs Presented at Sci. Conf. on Chem. Defense Res., Millersville, Md., 1 Nov. 1984

(Contract DE-AC02-76CH-00016)
(DE85-004057; BNL-35508; CONF-841124-2) Avail: NTIS HC A02/MF A01

When water-soluble polyacrylic acid (PAA) macromolecules having MW 90,000 to 250,000 are introduced into zinc phosphating liquids, significant improvements in the properties of conventional crystalline zinc phosphate conversion films deposited on carbon steel surfaces can be obtained. The improvements include the controllability of the crystal dimensions, the degree of crystallinity, and the coating weight. These improvements were studied experimentally using X ray photoelectron spectroscopy internal reflection infrared spectrophotometry, X ray powder diffraction and scanning electron microscopy. The conversion complex formation plays an essential role in increasing the ductility of the normally brittle conventional crystal films. Furthermore, the thickness (20 to 40 A) and surface roughness of the thin PAA overlayer significantly acts to enhance the adhesive force at the interface between organic polymer topcoats and the complex coating.
Author

N85-26975# Pacific Northwest Lab., Richland, Wash.
LOW DOSE IRRADIATION CREEP OF PURE NICKEL
C. H. Henager, Jr. Oct. 1984 233 p refs
(Contract DE-AC06-76RL-01830)
(DE85-006320; PNL-5034) Avail: NTIS HC A11/MF A01

A detailed climb-controlled glide model of low dose irradiation creep has been developed to rationalize irradiation creep data of pure nickel irradiated in a light ion irradiation creep apparatus. Experimental irradiation creep data were obtained to study the effects of initial microstructure and stress on low dose irradiation creep in pure nickel. Pure nickel specimens (99.992% Ni), with three different microstructures, were irradiated with 17 or 15 MeV deuterons at 473 K and stresses ranging from 0.35 to 0.9 of the unirradiated yield stress. Transmission electron microscopy revealed that the microstructure following irradiation to 0.05 dpa consisted of a high density of small dislocation loops, some small voids and network dislocations. The creep model predicted creep rates proportional to the mobile dislocation density and a comparison of experimental irradiation creep rates as a function of homologous stress revealed a dependence on initial microstructure of the magnitude predicted by the measured dislocation densities.
Author

N85-26976# Brookhaven National Lab., Upton, N. Y. Dept. of Nuclear Energy.
HYDROGEN INDUCED CRACK GROWTH IN GRADE-12 TITANIUM
T. M. Ahn and K. S. Lee 1984 41 p refs Sponsored by US Nuclear Regulatory Commission
(BNL-NUREG-35598; TI85-006689) Avail: NTIS HC A03/MF A01

Internal hydrogen-induced crack growth rates were measured in Grade-12 titanium at constant applied loads. Two types of crack propagation jump were observed. Measured striation spacings show that most crack growth rates observed are in stage 2 and that the crack path is either transgranular in the alpha phase or interfacial in the alpha phase adjacent to the beta phase. For transgranular crack growth, crack growth rates are steadier and slower than those for interfacial crack growth rates. The contribution of a plastic tearing process is significant in stage 2 kinetics. The fact that activation energies for transgranular crack growth rates are much lower than the activation energy of hydrogen diffusion through the alpha phase implies hydrogen transport occurs along dislocations, grain boundaries, or interfaces. As the temperature is increased, the crack velocity reaches a maximum and then decreases as the temperature is raised further. This decreased crack growth rate is considered to be from low hydrogen concentration around dislocations or from slower hydride nucleation kinetics. The effects of hydrogen concentration and grain size were not significant.
A.R.H.

N85-26977# Oak Ridge Y-12 Plant, Tenn.
EVALUATION OF THE CORROSION PROPERTIES OF ALUMINUM ALLOY 5083 WELDMENTS
V. A. Stanaland, J. J. Dillon, and R. K. Holbert, Jr. 5 Nov. 1984 17 p
(Contract DE-AC05-84OS-21400)
(DE85-007729; Y/DV-399) Avail: NTIS HC A02/MF A01

Susceptibility of the weldment to exfoliation corrosion was evaluated by the ammonium salt solution exfoliation test (ASSET). The samples exfoliated in the base metal, but did not exfoliate in the weld metal or the HAZ. The ASSET demonstrates that electron-beam welding the aluminum alloy 5083 reduces the susceptibility to exfoliation corrosion in the HAZ. Two other samples were tested for susceptibility to intergranular corrosion by the nitric acid weight loss test (NAWLT). The average weight loss was 167 mg/sq in. and the loss was associated with the attack that occurred in the base metal. The weld metal and HAZ were essentially unattacked.
DOE

N85-26978# Argonne National Lab., Ill. Materials Science and Technology Div.
TILT GRAIN BOUNDARIES IN NiO
K. L. Merkle, J. F. Reddy, and C. L. Wiley 1985 12 p refs Presented at the Ariz. State Univ. Centennial Symp. on High-Resolution Electron Microscopy, Tempe, Ariz., 7-11 Jan. 1985
(Contract W-31-109-eng-38)
(DE85-006839; CONF-850142-2) Avail: NTIS HC A02/MF A01

Attempts to apply high-resolution-electron microscopy (HREM) techniques to the imaging of [001] tilt grain boundaries in NiO are reported. Since the (200) interplanar spacing in NiO is a/2 = 2.09 A, the new generation of ultra-high resolution electron microscopes with a point-to-point resolution < 2A would be highly desirable. The initial observations, however, were performed on a JEOL 200CX, operated at 200 kV.
DOE

N85-26979# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
ON THE FEASIBILITY OF AB INITIO CALCULATIONS OF ORDERING ALLOY PHASE DIAGRAMS
D. deFontaine Nov. 1984 25 p refs Presented at the Materials Research Society Conf., Boston, 26-30 Nov. 1984
(Contract DE-AC03-76SF-00098)
(DE85-007073; LBL-18773; CONF-841157-84) Avail: NTIS HC A02/MF A01

Many stable or metastable intermetallic phases useful to the alloy designer have crystal structures which are ordered superstructures of a parent disordered phase. A highly reliable statistical mechanical method (CVM) has now been developed for calculating such superstructure phase equilibria derived from say, the fcc parent lattice. To obtain phase diagrams, one needs certain physical parameters, such as effective pair interaction ratios. It is possible, in principle, to extract these parameters from band structure calculations in the coherent potential approximation (CPA), particularly from recently developed cluster-CPA techniques. If sufficient accuracy can be achieved, truly first-principles phase diagram calculations may soon become feasible.
DOE

N85-26980# Foreign Resources Associates, Fort Collins, Colo.
Ca-Ga, Sr-Ga AND Ba-Ga BINARY SYSTEMS
G. Bruzzone Nov. 1984 19 p refs Transl. into ENGLISH from Boll., v. 24, 1966 p 113-131
(Contract DE-AC04-76DP-03533)
(DE85-006454; RFP-Trans-431) Avail: NTIS HC A02/MF A01

The binary systems calcium-gallium, strontium-gallium, barium-gallium have been investigated using thermal, metallographic and X-ray analysis. The three alkaline earth metals show a different behavior alloying with gallium. The following compounds exist respectively in the examined systems: CaGa4, CaGa2 (two modifications), Ca2Ga3, CaGa, Ca2Ga, Ca5Ga2, Ca3Ga; SrGa4, SrGa2, Sr3Ga2; BaGa4, GaGa2, BaGa, Ba3Ga2, Ba10 12Ga.
DOE

N85-26981# California Univ., Berkeley. Lawrence Berkeley Lab.
MODELS OF LONG-PERIOD SUPERSTRUCTURE
J. Kulik and D. deFontaine Jun. 1984 9 p refs Presented at

Intern. Conf. on Phase Transformation in Solids, Crete, Greece, 27 Jun. 1983
(Contract DE-AC03-76SF-00098)
(DE85-007659; LBL-18943; CONF-8306165-2) Avail: NTIS HC A02/MF A01

The cause of the stability of long-period superstructures is still something of a mystery. Two very different models are proposed: according to model 1, the period of the superstructure (or modulation) is determined by lowering of the electronic energy resulting from the formation of a new Brillouin zone. According to model 2, competing short-range interactions tend to produce long-period structures, the wavelength of which is determined by configurational entropy considerations. Model 1 is exemplified by the Sato and Toth theory, apparently applicable to long-period superstructures in Cu-Au, for example. Model 2 is exemplified by the axial next nearest neighbor Ising model, for which a low-temperature free energy expansion was given by Fisher and Selke. The latter model appears to apply to long-period superstructures in Ag3Mg. DOE

N85-26982# Hanford Engineering Development Lab., Richland, Wash.
SWELLING BEHAVIOR OF TITANIUM-MODIFIED AISI 316 ALLOYS
F. A. Garner, H. R. Brager, and R. J. Puigh 1984 11 p refs Presented at 1st Intern. Conf. on Fusion Reactor Mater., Tokyo, 3 Dec. 1984
(Contract DE-AC06-76FF-02170)
(DE85-007470; HEDL-SA-3149-FP; CONF-841246-21) Avail: NTIS HC A02/MF A01

Titanium additions to stainless steels covering a wide compositional range around the specifications of AISI 316 result only in an increased delay period before neutron-induced void swelling proceeds. Once swelling is initiated the post transient behavior of both annealed and cold-worked titanium-modified steels is quite consistent with that of AISI 316, approaching a relatively temperature-independent swelling rate of approx. 1% per dpa. DOE

N85-26983# Oak Ridge National Lab., Tenn.
THERMAL ANNEALING OF Fe IMPLANTED Al2O3 IN OXIDIZING AND REDUCING ENVIRONMENT: REVISED VERSION
G. C. Parlow, C. W. White, C. J. McHargue, P. S. Sklad, and B. R. Appleton 1 Oct. 1984 18 p refs Presented at Ion Beam Modification of Mater. Conf., Ithaca, N.Y., 16 Jul. 1984
(Contract DE-AC05-84OR-21400)
(DE85-007546; CONF-840760-20-Rev) Avail: NTIS HC A02/MF A01

The effects of ion implantation of Al2O3 followed by thermal annealing in a reducing environment were studied and compared with the results obtained by annealing in an oxidizing environment. For the case of 160-keV implanted Fe, partially coherent crystalline precipitates are observed after annealing in an oxidizing environment, and evidence is presented that crystalline precipitates of a different nature also form during annealing in a reducing environment. The precipitates which form in an oxidizing annealing environment have a major channeling axis nearly aligned with the Al2O3 <0001> direction. These precipitates are tentatively identified as Fe3O4. Lattice damage recovery is also different in the two annealing environments. DOE

N85-26984# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
THE EFFECT OF LOW SHEET THICKNESSES ON THE FRACTURE TOUGHNESS OF AN Al ALLOY (7075-T6)
J. Schijve Apr. 1984 15 p refs
(VTH-LR-425) Avail: NTIS HC A02/MF A01

Bare 7075-T6 sheet specimens (width 160 mm) with a central crack length = 20, 40 and 60 mm and sheet thicknesses of 0.5, 1, 2 and 3.4 mm were quasi-statically loaded until failure to test the effects on fracture toughness (Kc). A small amount of stable crack extension is found in all tests. Stable crack extension occurs without significant crack jumps. Crack extension occurs in the shear mode (slant mode or 45 deg mode) for all thicknesses. If crack-edge buckling was not prevented lower failure stresses are obtained, especially for the lower sheet thicknesses and the longer cracks. For a decreasing sheet thickness, failure stress and Kc show a small but systematic decrease. The overall magnitude of Kc agrees with literature data. Author (ESA)

N85-26985# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
INFLUENCE OF PRETREATMENT, ENVIRONMENT AND STRAIN RATE ON STRESS CORROSION CRACKING OF THE ALUMINUM ALLOY 7075-T6
H. F. deJong and J. W. G. A. Berkelaar Apr. 1984 31 p refs
(VTH-LR-433) Avail: NTIS HC A03/MF A01

It is shown that the pretreatment of aluminum alloy 7075-T6 according to the German standard for stress corrosion testing LN 65666 results in a surface attack of the material, which might influence stress corrosion cracking (SCC) results. Addition of chromate ions to the LN 65666 environment eliminates the general corrosion of the material, but the stress corrosion time is drastically increased. Addition of hydrogen peroxide, or the use of synthetic seawater decreases the time-to-failure as compared to a 3 wt percent NaCl-environment. A decrease of the strain rate produces a more distinct SCC behavior in all environments. Author (ESA)

N85-26986# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
INVESTIGATION OF THE PITTING POTENTIAL OF RAPIDLY SOLIDIFIED ALUMINUM-LITHIUM ALLOYS
H. F. deJong and J. H. M. Martens Jul. 1984 25 p refs
(VTH-LR-434) Avail: NTIS HC A02/MF A01

The free corrosion and pitting potential of lithium-containing Al-Cu-Mg alloys, produced by a rapid solidification technique, is investigated. Alloys containing 0, 0.8, and 3 wt percent Li respectively were used. The pitting potential was measured with the potentiostatic method and the quasi-stationary potentiokinetic method. Addition of lithium results in a decrease of the free corrosion potential. The pitting potential becomes more negative when lithium is added to the alloy. Author (ESA)

N85-26872*# Rocketdyne, Canoga Park, Calif. Materials Engineering and Technology.
MATERIALS FOR ADVANCED ROCKET ENGINE TURBOPUMP TURBINE BLADES
W. T. Chandler *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 110-132 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11F

N85-26873*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DEVELOPMENT OF HYDROGEN RESISTANT ALLOYS Abstract Only
W. B. McPherson *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 133 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11F

N85-26874*# National Bureau of Standards, Boulder, Colo. Chemical Engineering Science Div.
IGNITION OF METALS IN HIGH PRESSURE OXYGEN
James W. Bransford *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 134-148 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11F

N85-26875*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
HIGH-PRESSURE HYDROGEN TESTING OF SINGLE CRYSTAL SUPERALLOYS FOR ADVANCED ROCKET ENGINE TURBOPUMP TURBINE BLADES
Richard A. Parr, Wendy S. Alter, Mary H. Johnston, and Joseph P. Strizak (ORNL) *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 150-163 refs Previously announced as N84-33563

(For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC

N85-26876*# Alabama Univ., Birmingham. Dept. of Materials Engineering.
RELATIONSHIPS BETWEEN MICROSTRUCTURE AND MICROFISSURING IN ALLOY 718
R. G. Thompson *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 164-179 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11F

N85-27081# Joint Publications Research Service, Arlington, Va.
RESEARCH ON PRODUCTS OBTAINED BY POWDER METALLURGY
H. Colan *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-85-019) 21 May 1985 p 31-37 Transl. into ENGLISH from Met. (Bucharest), Dec. 1984 p 625-628 (For primary document see N85-27077 16-31)
Avail: NTIS HC A03/MF A01

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N85-26987 Akron Univ., Ohio.
OIL RESISTANT SILICONE ELASTOMERS Progress Report, 1 Jan. - 31 Mar. 1957
Marvin A. Deisz and E. E. Bostick 31 Mar. 1957 25 p
(Contract DA-19-129-QM-681)
(AD-131523) Avail: NTIS HC A02/MF A01 CSCL 11/8

Solution polymerization of octamethylcycolotetrasiloxane, D4 with tetrahydrofuranascolvent was conducted. Viscosity average molecular weights were determined for several polymerizations. Increase in catalyst concentration was accompanied by increase in first order rate constant and decrease in viscosity average molecular weight. A sampling technique was developed to determine rate of polymerization of D4, in the presence of H2SO4 and FeCl3 as catalyst. It is indicated that the reaction rate increases with increasing catalyst concentration. E.A.K.

N85-26988 Department of the Navy, Washington, D. C.
FLUORINATED POLYESTERS Patent
T. M. Keller, inventor (to Navy) Issued 13 Nov. 1984 6 p Supersedes AD-D010821
(AD-D011611; US-Patent-4,482,702; US-Patent-Appl-SN-563435; US-Patent-Class-528-299) Avail: US Patent and Trademark Office CSCL 11/9

It is an object of this invention to produce a relatively inexpensive low surface energy polymer. It is another object of this invention to produce a polymer which is not highly fluorinated yet has a low surface energy. It is a further object of this invention to produce a polyester prepolymer from a tertiary fluorinated alcohol and a carboxylic acid. It is yet another object of this invention to provide new flourine containing polyester prepolymers terminated with both dicarboxylic acid chlorides and dihydroxyl groups. These and other objects are achieved by reacting a fluorinated alcohol, preferably tertiary, with a carboxylic acid having no fluorination on the alpha carbon. GRA

N85-26989*# Polytechnic Inst. of New York, Brooklyn. Arts and Sciences.
CHARACTERIZATION-CURING-PROPERTY STUDIES OF HBRF 55A RESIN FORMULATIONS Final Report
Eli M. Pearce and Jovan Mijovic 31 Jan. 1985 133 p refs
(Grant NAG2-229)
(NASA-CR-175836; NAS 1.26:175836) Avail: NTIS HC A07/MF A01 CSCL 11G

Characterization curing property investigations on HBRF 55A resin formulations are reported. The initial studies on as received cured samples cut from a full-size FWC are reviewed. Inadequacies of as-received and aged samples are pointed out and additional electron microscopic evidence is offered. Characterization of as-received ingredients of HBRF 55A formulation is described. Specifically, Epon 826, Epon 828, EpiRez 5022, RD-2 and various amines, including Tonox and Tonox 60.40, were characterized. Cure kinetics of various formulations are investigated. Changes in physical/thermal properties (viscosity, specific heat, thermal conductivity and density) during cure are described. E.A.K.

N85-26990*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FORMULATION/CURE TECHNOLOGY FOR ULTRAHIGH MOLECULAR WEIGHT SILPHENYLENE-SILOXANE POLYMERS
N. H. Hundley and W. J. Patterson May 1985 21 p refs
(NASA-TP-2476; NAS 1.60:2476) Avail: NTIS HC A02/MF A01 CSCL 11G

Molecular weights above one million were achieved for methylvinylsilphenylene-siloxane terpolymers using a two-stage polymerization technique which was successfully scaled up to 200 grams. The resulting polymer was vulcanized by two different formulations and compared to an identically formulated commercial methylvinyl silicone on the basis of ultimate strength, Young's modulus, percent elongation at failure, and tear strength. Relative thermal/oxidative stabilities of the elastomers were assessed by gradient and isothermal thermogravimetric analyses performed in both air and nitrogen. The experimental elastomer exhibited enhanced thermal/oxidative stability and possed equivalent or superior mechanical properties. The effect of variations in prepolymer molecular weight on mechanical properties was also investigated. Author

N85-26991*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF WEAR ON STRUCTURE-SENSITIVE MAGNETIC PROPERTIES OF CERAMIC FERRITE IN CONTACT WITH MAGNETIC TAPE
Kazuhisa Miyoshi, Donald H. Buckley, and Kyuichiro Tanaka (Kanazawa Univ., Japan) 1985 26 p refs Proposed for presentation at the Tribology Conf., Atlanta, 8-10 Oct. 1985; sponsored in part by Am. Soc. of Lubrication Engr. and ASME
(NASA-TM-87007; E-2483; NAS 1.15:87007) Avail: NTIS HC A03/MF A01 CSCL 11G

Wear experiments and electron microscopy and diffraction studies were conducted to examine the wear and deformed layers in single-crystal Mn-Zn (ceramic) ferrite magnetic head material in contact with magnetic tape and the effects of that contact on magnetic properties. The crystalline state of the single-crystal magnetic head was changed drastically during the sliding process. A nearly amorphous structure was produced on its wear surface. Deformation in the surficial layer of the magnetic head was a critical factor in readback signal loss above 2.5 dB. The signal output level was reduced as applied normal load was increased. Considerable plastic flow occurred on the magnetic tape surface with sliding, and the signal loss due to the tape wear was approximately 1 dB. Author

N85-26992*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENVIRONMENTAL STABILITY OF INTERCALATED GRAPHITE FIBERS
J. R. Gaier and D. A. Jaworske May 1985 16 p refs Presented at the Intern. Symp. in Graphite Intercalation Compounds, Tsukuba, Japan, 27-30 May 1985; sponsored by Physical Society of Japan and the Carbon Society of Japan
(NASA-TM-87025; E-2580; NAS 1.15:87025) Avail: NTIS HC A02/MF A01 CSCL 11G

Graphite fibers intercalated with bromine, iodine monochloride, ferric chloride, and cupric chloride were subjected to stability tests under four environments which are encountered by engineering materials in the aerospace industry: ambient laboratory conditions, as would be experienced during handling operations and terrestrial applications; high vacuum, as would be experienced

in space applications; high humidity, as would be experienced in marine applications; and high temperature, as would be experienced in some processing steps and applications. Monitoring the resistance of the fibers at ambient laboratory conditions revealed that only the ferric chloride intercalated fibers were unstable, due to absorption of water from the air. All four types of intercalated fibers were unstable, due to absorption of water from the air. All four types of intercalated fibers were stable for long periods under high vacuum. Ferric chloride, cupric chloride, and iodine monochloride intercalated fibers were sensitive to high humidity conditions. All intercalated fibers began to degrade above 250 C. The order of their thermal stability, from lowest to highest, was cupric chloride, iodine monochloride, bromine, and ferric chloride. Of the four types of intercalated fibers tested, the bromine intercalated fibers appear to have the most potential for application, based on environmental stability. Author

N85-26993*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF COUNTERFACE MATERIAL TYPE AND ITS TOPOGRAPHY ON THE TRIBOLOGICAL PROPERTIES OF POLYIMIDE COMPOSITES
Robert L. Fusaro 1985 33 p refs Proposed for presentation at the Tribology Conf., Atlanta, 8-10 Oct. 1985; sponsored by American Society of Lubrication Engineers and ASME
(NASA-TM-87036; E-2592; NAS 1.15:87036) Avail: NTIS HC A03/MF A01 CSCL 11B

Graphite fiber reinforced polyimide composite pins were slid against seven different counterfaces to determine the effect of material type on the tribological properties of polymer composites. In addition, the effect of sliding a new pin on a pre-established transfer film was investigated. The results indicated that almost a five order of magnitude difference in composite wear rate can occur just by varying the counterface material. An attempt to make all surfaces as smooth as possible was made, but due to differences in material composition this was not possible and a range of surface roughnesses were obtained. The results indicate that the smoother the surface, the lower the composite wear rate; but that small protrusions (not discernible with arithmetic surface roughness measurements) can markedly increase wear rates. A pre-established transfer film improved both run in and steady state wear rates. M.G.

N85-26994*# Westinghouse Research Labs., Pittsburgh, Pa.
BREAKWAY FRICTION AND DYNAMIC FRICTION/WEAR MEASUREMENTS OF VARIOUS CERAMIC MATERIALS FROM 25 C (75 F) TO 650 C (1200 F) Final Report
D. J. Boes Sep. 1984 82 p refs
(Contracts DEN3-346; DE-AI01-80CS-50194)
(NASA-CR-174803; DOE/NASA/0346-1; NAS 1.26:174803; ; Rept-85-9JDIESL-R1) Avail: NTIS HC A05/MF A01 CSCL 11B

This report describes the results of a program designed to evaluate the breakaway friction and dynamic friction/wear characteristics of materials having potential for use as load bearing components in a high-performance high-temperature heavy duty diesel engine. Ten candidate materials were selected, six of which were evaluated under all possible material combinations as both stationary as well as moving breakaway specimens. The remaining materials were evaluated either in the static mode against themselves and all other materials, or against themselves only. Experiments were performed at five temperatures up to 650 C (1200 F) and unit pressures of 700 kPa (100 lb/sq in.), 3500 kPa (500 lb/sq in.), and 7000 kPa (1000 lb/sq in.). Experimental results indicate that under dynamic conditions, four of the ten materials exhibited good to excellent friction/wear characteristics in various material combinations. These materials were: titanium carbide, silicon nitride, silicon carbide (reaction sintered), and Refel (SiC). B.W.

N85-26995*# Springborn Labs., Inc., Enfield, Conn. Dept. of Analytical Chemistry.
DEVELOPMENT OF ACCEPTANCE CRITERIA FOR BATCHES OF SILANE PRIMER FOR EXTERNAL TANK THERMAL PROTECTION SYSTEM BONDING APPLICATIONS Progress Report, 2 Mar. - 24 May 1985
F. Mikes, C. Mowrey, and E. Reis 10 Apr. 1985 66 p
(Contract NAS8-35818)
(NASA-CR-175850; NAS 1.26:175850; PR-11) Avail: NTIS HC A04/MF A01 CSCL 11C

Results of lap shear tests of various silane primers are presented in graphs and tables. The OH-absorption of these primers (FTIR area values) are correlated with the lap shear tests of coated panels. A.R.H.

N85-26996*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EVALUATION OF EXPERIMENTAL EPOXY MONOMERS
W. T. Hodges (Army Research and Technology Lab., Hampton, Va.), T. L. St.Clair, J. R. Pratt (Mississippi Univ. for Women), and Robin Ficklin (Mississippi Univ. for Women) 1985 16 p refs Submitted for publication
(NASA-TM-87476; NAS 1.15:87476) Avail: NTIS HC A02/MF A01 CSCL 11B

Future generation aircraft need higher performance polymer matrices to fully achieve the weight savings possible with composite materials. New resins are being formulated in an effort to understand basic polymer behavior and to develop improved resins. Some polymer/curing agent combinations that could be useful are difficult to process. In the area of epoxies, a major problem is that some components have physical properties which make them difficult to utilize as matrix resins. A previous study showed that the use of ultrasonic energy can be advantageous in the mixing of curing agents into a standard epoxy resin, such as MY 720 (Ciba-Geigy designation). This work is expanded to include three novel epoxides. R.J.F.

N85-26997# Columbia Univ., New York. Dept. of Chemistry.
SYNTHESIS OF PHENOLS FROM METAL-CARBYNES AND DIYNES
T. M. Sivavec and T. J. Katz 7 Mar. 1985 9 p
(Contract N00014-79-C-0683)
(AD-A151913; TR-10) Avail: NTIS HC A02/MF A01 CSCL 07/3

Metal-carbynes RC-M(CO)4BrTriple bond with diacetylenes give specific phenols in good yield. The reactions take only a few minutes at or below room temperature. Metal-carbynes, unlike metal-carbenes, have rarely been considered reagents for organic synthesis although those illustrated by structure 1 have been known for a dozen years and are fairly easy to prepare. We reported recently that a number of tungsten metal-carbynes, by polymerizing a variety of acetylenes and cyclic alkenes, behave as though they were reactive metal-carbenes. We are reporting here that, as illustrated in equation 1, they combine stoichiometrically with a variety of diacetylenes to give specific phenols in a seemingly general process that is simple to carry out. GRA

N85-26998# Monsanto Research Corp., Dayton, Ohio.
DAMAGE CAUSED TO POLYURETHANE FOAMS BY AGING, SIMULATED SUNLIGHT EXPOSURE, HEAT AND FIRE Final Report, 15 Jan. - 30 Sep. 1983
L. Parts, T. A. Hogan, and T. J. Condron Wright-Patterson AFB, Ohio AFWAL Jul. 1984 294 p
(Contracts F33615-78-C-2023; F33615-81-C-2035)
(AD-A152040; MRC-DA-1150; AFWAL-TR-84-2048) Avail: NTIS HC A13/MF A01 CSCL 11/9

Damage caused to reticulated polyurethane foams by aging (in air and liquid fuel), simulated sunlight exposure, hot wire cutting, hot air impingement, flame impingement, and sustained burning was investigated. The experiments simulated all conceivable types of environmental and unplanned exposure of these foams when used as explosion suppressant materials in aircraft fuel systems. Both polyether- and polyester-based polyurethanes were used. It was demonstrated that the physical appearance of foams is often indicative of past exposure. A detailed photographic record of exposed specimens was obtained. The compilation of photographs,

in conjunction with written description of damage, will serve as a reference for aircraft and fire accident investigators. GRA

N85-26999# Akron Univ., Ohio. Inst. of Polymer Science.
PLASTIC DEFORMATION OF CRYSTALLINE POLYMERS
A. N. Gent and J. Jeong Mar. 1985 31 p
(Contract N00014-76-C-0408)
(AD-A152090; TR-36) Avail: NTIS HC A03/MF A01 CSCL 11/9

Draw ratios have been measured for samples of polyethylene and trans-polyisoprene, crystallized at various temperatures and at various degrees of orientation. The values obtained range from unity, i.e., no drawing is observed, up to values of about 15X for materials crystallized in the oriented state and then drawn in a perpendicular direction. The results are in rough accord with a simple molecular network model in which network strands are incorporated into crystallites with a number of reversals of direction (folds), and the remainder of a strand between network functions is randomly arranged. The reduction in draw ratio with increasing temperature of crystallization and with increasing orientation at the time of crystallization in then accounted for in terms of a reduction in the number of reversals (folds) per molecular strand. Differences in natural draw ratio for different polymers are attributed to variations in characteristic sequence length within a crystallite and in the number of folds per network strand. GRA

N85-27000# Texas A&M Univ., College Station. Dept. of Chemistry.
LUMINESCENCE PROBE STUDIES OF IONOMERS. 2. STEADY-STATE MEASUREMENTS FROM SULFONATED POLY-ETHYLENE AND TEFLON MEMBRANES
M. N. Szentirmay, N. E. Prieto, and C. R. Martin 3 Feb. 1985 24 p
(Contract N00014-82-K-0612)
(AD-A152233; TR-9) Avail: NTIS HC A02/MF A01 CSCL 07/4

Luminescence probe studies of sulfonated Teflon and sulfonated polyethylene ionomer membranes are described. These membranes were obtained from RAI Research Corporation of Hauppauge, N.Y. and were prepared via radiation grafting side-chains onto preformed Teflon and polyethylene sheets. The intent of these investigations was to determine how the membrane water content and the nature of the counterion affect the chemical characteristics of the ionic cluster phases in these ionomers. Three luminescent molecules, pyrene, Ru(bpy)32+ (bpy=2,2'-bipyridine), and a quaternary ammonium-containing dansyl derivative were used to probe the cluster microenvironment. We have found that the cluster micropolarity is quite dynamic, being close to aqueous-like when the membrane water content is high and extremely nonpolar when the water content is low. These studies also suggest that mainchain material intrudes into the ionic cluster. GRA

N85-27001# Hunter Coll., New York. Dept. of Physics and Astronomy.
ION AND POLYMER CHAIN MOTION IN A SUPERIONIC SODIUM-POLY(ETHYLENE OXIDE) COMPLEX Interim Technical Report
S. G. Greenbaum and A. N. Shetty Nov. 1985 21 p
(Contract N00014-84-K-0010)
(AD-A152290; TR-3) Avail: NTIS HC A02/MF A01 CSCL 07/4

Magnetic resonance measurements have been performed on the ion conducting complex poly(ethylene oxide)4.5NaClO4. Low temperature 23Na NMR spectra suggest a highly symmetric environment for the Na-ions as evidenced by the absence of quadrupole broadening. Proton spin-lattice relaxation measurements provide an estimate of 4x10 to the -10 power sec for the polymer chain motional correlation time at T=69C. Correlation times of tumbling paramagnetic probe molecule have been extracted from EPR spectra of 15N-enriched TANOL-doped complex. Changes in polymer chain mobility above T=120C are inferred from the results and may be consistent with previous scanning calorimetry measurements. GRA

N85-27002# Oak Ridge National Lab., Tenn.
CERAMIC TECHNOLOGY FOR ADVANCED HEAT ENGINES PROJECT
D. R. Johnson, A. C. Schaffhauser, R. B. Schulz, V. J. Tennery, and E. L. Long, Jr. 1984 10 p refs Presented at Automotive Technol. Develop. Contractors' Coordination Meeting, Dearborn, Mich., 29 Oct. 1984
(Contract DE-AC05-84OR-21400)
(DE85-004798; CONF-8410103-5) Avail: NTIS HC A02/MF A01

A ceramic base technology project to support the ongoing proof-of-concept ceramic engine and component development programs was initiated. The purpose of the project is the development of an industrial ceramic technology base required for ceramic engine components. The project includes a balanced emphasis on the three technology areas thought necessary to achieve reliability in structural ceramics: (1) materials and processing, (2) design methodology, and (3) data base and life prediction. A list and brief description of ongoing or newly started development tasks in fiscal year 1984 are presented. DOE

N85-27003# Los Alamos Scientific Lab., N. Mex. Materials Science and Technology Div.
MICROWAVE PROCESSING OF LUNAR MATERIALS: POTENTIAL APPLICATIONS
Thomas T. Meek, Franklin H. Cocks (Duke Univ.), David T. Vaniman, and Robin A. Wright (Columbia Univ.) 1984 18 p refs Presented at the Conf. on Lunar Bases and Space Activities of the 21st Century, Washington, D.C., 29 Oct. 1984
(Contract W-7405-eng-36)
(DE85-007223; LA-UR-85-312; CONF-8410230-2) Avail: NTIS HC A02/MF A01

The microwave processing of lunar materials holds promise for the production of either water, oxygen, primary metals, or ceramic materials. Extra high frequency microwave (EHF) at between 100 and 500 gigahertz have the potential for selective coupling to specific atomic species and a concomitant low energy requirement for the extraction of specific materials, such as oxygen, from lunar ores. The coupling of ultra high frequency (UHF) microwave frequencies to hydrogen-oxygen bonds might enable the preferential and low energy cost removal (as H2O) of implanted protons from the Sun or of adsorbed water which might be found in lunar dust in permanently shadowed polar areas. Microwave melting and selective phase melting of lunar materials could also be used either in the preparation of simplified ceramic geometries (e.g., bricks) with custom-tailored microstructures, or for the direct preparation of hermetic walls in underground structures. DOE

N85-27004# Rensselaer Observatory, Troy, N. Y. Dept. of Materials Engineering.
TEST AND MODELING FOR SINTERING THEORY Progress Report, 1 Jan. - 30 Dec. 1984
R. H. Doremus and R. M. German 1985 6 p
(Contract FG02-84ER-45086)
(DE85-007761; DOE/ER-45086/4) Avail: NTIS HC A02/MF A01

Better mechanisms and morphology changes during sintering of alumina were examined. Pure alumina powder were prepared by precipitation from solution and a commercial powder was studied. Microstructural examination of the precipitated powders as they are sintered, shrinkage and surface area measurements, and extended the work to sintering of mixed alumina-chromia powders are emphasized. DOE

N85-27005# Oak Ridge National Lab., Tenn.
IONIC CONDUCTION AND WATER DIFFUSION IN LI (BETA)-ALUMINA
J. C. Wang, J. B. Bates, and N. J. Dudney Feb. 1985 33 p refs Presented at the Southeastern Regional American Chemical Society Meeting, Charlotte, N. Car., 9 Nov. 1983
(Contract DE-AC05-84OR-21400)
(DE85-007548; CONF-8311198-2) Avail: NTIS HC A03/MF A01

Lithium (BETA)-alumina is a compound that has exceptionally high ionic conductivities. Partly as a consequence of the small size of the Li(+) ion, the properties of Li (BETA)-alumina such as

structure and conductivity are exceptions to the trends set by other alkali-metal (BETA)-aluminas. Both Li and Na (BETA)-alumina absorb water molecules into their conduction layers, but the hydration rate of Li (BETA)-alumina is much higher. The properties of Li (BETA)-alumina are analyzed. The interstitially condition mechanism responsible for the high ionic conductivity in Na (BETA)-alumina is found to be applicable in Li (BETA)-alumina, but the conduction path is modified. The rapid diffusion of H2O in Li (BETA)-alumina is attributed to the tendency of water molecules to dissociate in the material. DOE

N85-27006# Sandia Labs., Albuquerque, N. Mex. Solar Central Receiver Test Facility.
SCREENING CERAMIC MATERIALS FOR INTENSE RADIANT HEAT APPLICATIONS
John T. Holmes, Robert M. Edgar, and Paul F. Gerrish 1985 7 p refs Presented at the 9th Ann. Conf. on Composites and Advan. Ceramic Mater. and Workshop on Testing Methods for Ceramic Matrix Composites, Cocoa Beach, Fla., 20-24 Jan. 1985
(Contract DE-AC04-76DP-00789)
(DE85-006989; SAND-84-1648C; CONF-850122-1) Avail: NTIS HC A02/MF A01

The Sandia 16kW solar furnace was used to expose the candidate materials to high flux density sunlight. The specimen (normally 6 x 6 x 1 in. size) was positioned at the focus of the parabolic concentrator with the attenuator closed. The attenuator was opened incrementally in steps of about 5 w/sq. cm. Each step up was made after holding a constant flux density on the last step for one minute. The specimen was visually observed during the flux density increases using our closed circuit video system. We considered failure to be the flux density at which the specimen started to melt, crack or shrink. While working out this test procedure, it was determined that step plateaus longer than one minute did not alter the flux density at which the specimen failed. DOE

N85-27007# Oak Ridge National Lab., Tenn.
DEVELOPMENT OF A NEW FASTER PROCESS FOR THE FABRICATION OF CERAMIC FIBER-REINFORCED CERAMIC COMPOSITES BY CHEMICAL VAPOR INFILTRATION
A. J. Caputo, W. J. Lackey, and D. P. Stinton 1985 19 p refs Presented at 9th Ann. Conf. on Composites and Advan. Ceramic Mater. and Workshop on Testing Methods for Ceramic Matrix Composites, Cocoa Beach, Fla., 20 Jan. 1985
(Contract DE-AC05-84OR-21400)
(DE85-007550; CONF-850122-2) Avail: NTIS HC A02/MF A01

A new, faster process was developed for the fabrication of ceramic fiber-reinforced, ceramic-matrix composites by chemical vapor infiltration. Process and equipment improvements led to the fabrication of preforms with a higher fiber content, and infiltration improvements led to reduced infiltration run times and increased infiltrated densities. These improvements have produced composites with not only higher flexural strengths but also high strain values. DOE

N85-27008# Institut Franco-Allemand de Recherches, St. Louis (France).
PIEZOELECTRIC AND PYROELECTRIC POLYMERS
Francois Bauer 1983 50 p refs Presented at Polymers as Synthetic Metals Conf., London, 17-18 May 1983
Avail: NTIS HC A03/MF A01

Electrets, ferroelectrics, and oriented polymers are defined. Piezoelectric equations are outlined. The ferroelectric and piezoelectric properties of PVF2 polymer are summarized. Investigations of PVF2 under uniaxial compression and under X-ray irradiation are described. The applications of PVF2 are discussed. The behavior of PVF2 under the action of a shock wave and its use in igniters are considered. Author (ESA)

N85-27009# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
INVESTIGATION OF THE INFLUENCE OF SOME PAINT SYSTEMS AND WATER DISPLACING CORROSION INHIBITORS ON ANODIC UNDERMINING CORROSION OF ALUMINUM 2024 CLAD ALLOY
H. F. deJong and W. A. J. Moonen Oct. 1984 30 p refs
(VTH-LR-443) Avail: NTIS HC A03/MF A01

The influence of 2 low-chromate paint systems and 2 water displacing corrosion inhibitors (WDCI) on the anodic undermining corrosion behavior of aluminum 2024-T3 clad alloy was investigated in salt spray and alternate immersion tests. Results indicate that the use of a top coat layer in a low-chromate paint system enhances the anodic undermining corrosion. This is attributed to a lower oxygen concentration in the blisters due to the reduced diffusion of oxygen through the thick paint layer. The oxygen concentration is too low to repassivate the anode. The application of a WDCI offers good protection only as long a good WDCI-layer is maintained. A partly washed off WDCI layer results in an increase in the number of blisters. Author (ESA)

N85-26867*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ROCKET THRUST CHAMBER THERMAL BARRIER COATINGS
Richard J. Quentmeyer *In* NASA. Marshall Space Flight Center. Advan. High Pressure O2/H2 Apr. 1985 p 49-58 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11B

N85-26868*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.
CERAMICS FOR ADVANCED O2/H2 APPLICATION
H. W. Carpenter *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 59-73 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11B

N85-26869*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
VACUUM PLASMA COATINGS FOR TURBINE BLADES
Richard R. Holmes *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 74-90 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11G

N85-27726 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
ULTRASONIC TESTING OF CARBON FIBER REINFORCED PLASTICS (CFRP) USING PATTERN RECOGNITION METHODS [ULTRASCHALL PRUEFUNG VON CFK MITTELS METHODEN DER MUSTERERKENNUNG]
R. Bilgram *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 23-51 refs In GERMAN Presented at Intern. Wehrtech. Symp. CKF-Eigenschaften, Pruefung u. Bewertung von Kohlefaserverstaerkten Kunststoffen, Erding, West Germany, 8-10 May 1985 (For primary document see N85-27724 16-81)
(MBB-BB-563/84-0) Avail: Issuing Activity

N85-27727 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Hauptabteilung Metalle.
CHARACTERISTICS AND APPLICATIONS OF SUPERPLASTIC MATERIALS FOR AERONAUTICS [EIGENSCHAFTEN UND ANWENDUNGEN SUPERPLASTISCHER WERKSTOFFE FUER DIE LUFT- UND RAUMFAHRT]
Peter-J. Winkler *In its* Res. and Develop. Tech. Sci. Repts. 1984 1984 p 53-60 refs In GERMAN (For primary document see N85-27724 16-81)
(MBB-BB-565/84-O) Avail: Issuing Activity

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N85-27010 Illinois Univ., Urbana.
ANALYSIS OF DEFLAGRATION TO DETONATION TRANSITION

IN HIGH-ENERGY SOLID PROPELLANTS Ph.D. Thesis
Patrick Barry Butler 1984 177 p
Avail: Univ. Microfilms Order No. DA8502087

Increasing the nitramine content of solid rocket propellants increases the overall performance of the system as well as the sensitivity to detonation by shock initiation. Under certain circumstances deflagration to Detonation Transition (DDT) can occur in high-energy solid propellant that has been granulated. The work presented represents an effort to analyze three distinct ways in which high-energy solid propellant can undergo a DDT. The emphasis of the research is on the transient events prior to the detonation as well as the steady state detonation conditions. The system of partial differential equations describing one-dimensional, two-phase, reactive flow are solved by a Method of Lines (MOL) computer solution technique. Predictions for CJ properties, detonation run-up distance and detonation velocity compare favorably with experimental data and predictions made using the TIGER chemical equilibrium computer code. Dissert. Abstr.

N85-27011 Department of the Navy, Washington, D. C.
SOLID STATE HYDROGEN PUMPING AND STORAGE MATERIAL Patent
D. W. Forester, P. Lubitz, and C. Vittoria, inventors (to Navy) Issued 18 Dec. 1984 5 p Supersedes AD-D009673
(AD-D011610; US-Patent-4,489,049; US-Patent-Appl-SN-386465; US-Patent-Class-423-644) Avail: US Patent and Trademark Office CSCL 21/4

An object of the present invention is to provide a solid-state hydrogen storage material that does not require high pressure for efficient absorbtion or high temperature for efficient discharge. A further object of the present invention is to provide a solid-state hydrogen material that is not impaired by atmospheric exposure and that does not discharge hydrogen at room temperature. The above and other objects are achieved in the present invention which comprises a layer of an amorphous binary alloy of a lanthanide and iron, nickel or cobalt disposed on a suitable substrate and overcoated with a palladium metal layer. The present invention adsorbs hydrogen at low pressures, resists surface poisoning, stores hydrogen at room temperature, and discharges hydrogen by heating the storage material to a relatively moderate temperature. GRA

N85-27012*# Exxon Research and Engineering Co., Linden, N.J. Products Research Div.
JET FUEL PROPERTY CHANGES AND THEIR EFFECT ON PRODUCIBILITY AND COST IN THE U.S., CANADA, AND EUROPE Final Report
G. M. Varga, Jr., A. J. Avella, Jr., A. R. Cunningham, C. D. Featherston, J. F. Gorgol, A. J. Graf, M. Lieberman, and G. A. Oliver Feb. 1985 205 p refs
(Contract NAS3-22769)
(NASA-CR-174840; NAS 1.26:174840; RL-1PD-85) Avail: NTIS HC A10/MF A01 CSCL 21D

The effects of changes in properties and blending stocks on the refinery output and cost of jet fuel in the U.S., Canada, and Europe were determined. Computerized refinery models that minimize production costs and incorporated a 1981 cost structure and supply/demand projections to the year 2010 were used. Except in the West U.S., no changes in jet fuel properties were required to meet all projected demands, even allowing for deteriorating crude qualities and changes in competing product demand. In the West U.S., property changes or the use of cracked blendstocks were projected to be required after 1990 to meet expected demand. Generally, relaxation of aromatics and freezing point, or the use of cracked stocks produced similar results, i.e., jet fuel output could be increased by up to a factor of three or its production cost lowered by up to $10/cu m. High quality hydrocracked stocks are now used on a limited basis to produce jet fuel. The conversion of U.S. and NATO military forces from wide-cut to kerosene-based jet fuel is addressed. This conversion resulted in increased costs of several hundred million dollars annually. These costs can be reduced by relaxing kerosene jet fuel properties, using cracked stocks and/or considering the greater volumetric energy content of kerosene jet fuel. E.A.K.

N85-27013# Naval Weapons Center, China Lake, Calif.
THE REMOTE DETECTION OF POLYNUCLEAR AROMATIC HYDROCARBONS USING LASER-INDUCED FLUORESCENCE Interim Report, Jan. 1982 - Aug. 1984
R. T. Loda Jan. 1985 39 p
(F65559; S0400)
(AD-A152294; AD-E900445; NWC-TP-6587) Avail: NTIS HC A03/MF A01 CSCL 19/1

This publication discusses the feasibility of remotely detecting gas-phase polynuclear aromatic hydrocarbons (PAHs) that might be produced during the combustion of propellant, explosive, and pyrotechnic (PEP) materials. Laboratory scale and remote laser-induced fluorescence measurements are presented. GRA

N85-27014# Ballistic Research Labs., Aberdeen Proving Ground, Md.
FIBER REINFORCEMENT OF GUN PROPELLANT Final Technical Report
L. J. VandeKieft and W. W. Hillstrom Feb. 1985 43 p
(DA Proj. 1L1-61101-A-91-A)
(AD-A152296; AD-F300587; BRL-TR-2638) Avail: NTIS HC A03/MF A01 CSCL 19/1

The basis for this paper is the hypothesis that explosive reactions of gun propellant charges subjected to gross damage from attack by shaped charge (SC) or kinetic energy (KE) rounds are the result of catastrophic grain failures; i.e., that as a result of this type of event, the reactive surface area is increased by many orders of magnitude. Thus, given a propellant ignition by the impact of the SC or KE round, the gas generation rate will also be orders of magnitude greater than that for which the propellant was designed. To obviate this, it was proposed that propellant grains be made stronger through the addition of small percentages of high strength-to-weight-ratio materials; e.g., graphite fibers. It was anticipated that these reinforcing elements would assume the stress, and because of their extremely large elastic moduli would tend to limit the strain experienced by the propellant material. This in turn would tend to limit the damage, in particular the fracturing experienced by the propellant grains, and thus limit the gas generation rate. Representative fibers and propellants were selected, mixed, and tested for sensitiveness and mechanical properties. Response to standard sensitiveness tests was relatively unaffected by fiber addition; mechanical properties of a Low Vulnerability Ammunition (LOVA) propellant, CAB/RDX, were enhanced while those of a standard propellant, M-30, were degraded. GRA

N85-27015# Ballistic Research Labs., Aberdeen Proving Ground, Md.
DETONATION VELOCITY MEASUREMENTS OF THE EXPLOSIVES DETASHEET C AND AMATOL Memorandum Report, Sep. 1981 - Dec. 1983
P. H. Netherwood, Jr. Jan. 1985 24 p
(DA Proj. 1L1-62618-AH-80)
(AD-A152298; AD-F300593; BRL-MR-3427) Avail: NTIS HC A02/MF A01 CSCL 19/1

The detonation velocities of the explosives Detasheet C and 80-20 Amatol were measured using resistance-wire gages. The techniques used to obtain reproducible results with these gages are described. The detonation velocity measured for 1.6 mm thick Detasheet C was 6.93 mm/micro second. The detonation velocity of powdered 80-20 Amatol was a function of charge thickness, measuring 2.32 mm/micro second, for a charge thickness of 6.4 mm, and 3.86 mm/micro second for a charge thickness of 20 mm. GRA

N85-27016# Sandia Labs., Albuquerque, N. Mex.
SURVEILLANCE PROGRAM FOR THE DISSECTION AND ANALYSIS OF EXPLOSIVE AND PYROTECHNIC COMPONENTS

D. A. Clements 1985 7 p refs Presented at the ADPA Meeting, Hilton Head, S. Car., 11 Mar. 1985
(Contract DE-AC04-76DP-00789)
(DE85-006105; SAND-84-1890C; CONF-8503100-1) Avail: NTIS HC A02/MF A01

The Sandia National Laboratories surveillance program for the dissection and material analysis of Sandia designed explosive components is described. The program embraces approximately fifteen different categories of components (actuators, spin rocket motors, firesets, transfer lines, etc.). Nondestructive tests, in addition to material analyses, are performed with emphasis placed on the bridged header and explosive materials. The structure and purpose of the program are described. The description includes the components and materials involved; program design; and methods of evaluation. DOE

N85-27017# Gulf Research and Development Co., Pittsburgh, Pa.
LOW PRESSURE STORAGE OF METHANE ON INTERLAYERED CLAYS FOR POTENTIAL VEHICULAR APPLICATIONS
R. A. Innes, F. E. Iutinski, M. I. Occelli, and J. V. Kennedy Jul. 1984 62 p refs
(Contract DE-AC01-84CE-50071)
(DE85-006949; DOE/CE-50071/1) Avail: NTIS HC A04/MF A01

Inexpensive, high surface area sorbents were prepared by treating naturally occurring hectorite and bentonite clays with aluminum chlorohydroxide, zirconium chlorohydroxide, or silica-sol solutions. Data were obtained comparing these interlayered clays with activated carbons and zeolites as sorbents for the low pressure storage of methane onboard natural gas powered vehicles. Methane sorption at pressures up to 7 MPa (1000 psig) resembled a Langmuir-type curve with a saturation sorption equal to about six micromoles of methane per square meter of surface area. Even at low pressures, methane sorption capacity was largely determined by surface area. DOE

N85-27018# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
TECHNICAL AND ECONOMIC ANALYSIS OF LIQUID FUEL PRODUCTION FROM MICROALGAE
Daniel A. Feinberg Dec. 1984 20 p refs Presented at Energy from Biomass and Wastes, 9, Lake Buena Vista, Fla., 28 Jan. - 1 Feb. 1985
(Contract DE-AC02-83CH-10093)
(DE85-002926; SERI/TP-231-2608; CONF-850104-2) Avail: NTIS HC A02/MF A01

A technical and economic evaluation of the production of fuels from a microalgal feedstock was conducted. This effort was divided into two areas: feedstock production and subsequent conversion of the feedstock into fuels. An Algal Production and Economic Model was developed to estimate capital and operating costs for mass culture facilities. This model estimates that if today's technology were applied on a large scale, a microalgal feedstock suitable for conversion to fuels could be produced at a cost of $436/t (1984 dollars). Based on these microalgal production cost estimates, integrated refinery options for conversion of the microalgae to high energy liquid fuels were evaluated. Two processes were examined - one based on the conversion of triglycerides into methyl fatty esters, which are being extensively investigated as potential diesel fuel substitutes, and a catalytic reduction process for the production of hydrocarbons. DOE

N85-27019# Los Alamos Scientific Lab., N. Mex.
MODEL FOR COMPUTING LATE DETONATIONS INITIATED IN PROPELLANTS BY IMPACT (XDT REACTIONS)
R. R. Karpp Nov. 1984 44 p refs
(Contract W-7405-eng-36)
(DE85-007377; LA-10270-MS) Avail: NTIS HC A03/MF A01

A computational model that produces simulations of impact initiated later detonations in rocket motor propellants has been constructed and incorporated into hydrodynamic computer codes. For high speed impacts between cylindrical propellant projectiles and steel plates, the model correctly predicts the shock to detonation transition. For low speed impacts, the model correctly predicts the absence of detonation. At intermediate speeds where late detonations occur with reasonable probability, the model predicts the eventual development of detonation. The model is based upon the hypothesis that late detonations occur when the propellant from the front portion of the projectile that is damaged during the early stage of impact is impinged upon by the rear portion of the projectile, which is still toward the target with significant speed. This recompression of damaged, sensitive propellant appears to be the primary initiation mechanism of the XDT reaction. DOE

N85-27020# California Univ., Livermore. Lawrence Livermore Lab.
EMPIRICAL DEVELOPMENT OF GROUND ACCELERATION, VELOCITY AND DISPLACEMENT FOR ACCIDENTAL EXPLOSIONS AT J5 OR THE PROPOSED LARGE ALTITUDE ROCKET CELL AT ARNOLD ENGINEERING DEVELOPMENT CENTER
Barbara C. Davis Sep. 1984 41 p refs
(Contract W-7405-eng-48)
(DE85-008324; UCRL-53591) Avail: NTIS HC A03/MF A01

An assessment of the ground shock which may be generated in the event of an accidental explosion at J5 or the Proposed Large Altitude Rocket Cell (LARC) at the Arnold Engineering Development Center (AEDC) is given. The assessment is accomplished by reviewing existing empirical relationships for predicting ground motion from ground shock. These relationships are compared with data for surface explosions at sites with similar geology and with yields similar to expected conditions at AEDC. Empirical relationships are developed from these data and a judgment data whether to use existing empirical relationships or the relationships developed in this study. An existing relationship (Lipner, et al.) is used to predict velocity; the empirical relationships developed in the course of the study are used to predict acceleration and displacement. The ground motions are presented in table form and as contour plots. Included also is a discussion of damage criteria from blast and earthquake studies. It is recommended that velocity rather than acceleration be used as an indicator of structural blast damage. It is recommended that v = 2 ips (v = .167 fps) be used as the damage threshold value (no major damage for v less than or equal to 2 ips). DOE

N85-27021# Institut Franco-Allemand de Recherches, St. Louis (France).
GENERATION OF DETONATION WAVES OF GIVEN SPATIAL AND TEMPORAL CHARACTERISTICS [CREATION D'ONDES DE DETONATION DE FORME ET DE CARACTERISTIQUES TEMPORELLES DONNEES]
J. Vermorel 10 Feb. 1983 44 p refs In FRENCH
(ISL-R-103/83) Avail: NTIS HC A03/MF A01

A detonation system combining one explosive and voids is described. A geometric design based on the minimum optical path concept is used to obtain the initiation curve for a given wave shape. System precision is 100 times better than that of classical systems, and close to the precision obtained with ternary systems, but with only 5% of the mass of these configurations.
Author (ESA)

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N85-27022# Tohoku Univ., Sendai (Japan).
THE RECORD OF ELECTRICAL AND COMMUNICATION ENGINEERING CONVERSAZIONE, VOLUME 53, NO. 2, NOVEMBER 1984
Nov. 1984 52 p refs In JAPANESE and ENGLISH
(ISSN-0385-7719) Avail: NTIS HC A04/MF A01

Studies in electrical and communication engineering in Japan are reviewed. Some areas covered are: Information transmission

engineering; Proposal of a method for evaluating accuracy of estimated impulse response of a system; Design of an English word processor; and Gravitational waves. For individual titles, see N85-27023 through N85-27026.

N85-27023# Tohoku Univ., Sendai (Japan). Dept. of Communication Engineering.
HISTORICAL PERSPECTIVES ON INFORMATION TRANSMISSION ENGINEERING c32
Risaburo Sato *In its* The Record of Elec. and Comm. Eng. Conversazione, Vol. 53, No. 2, Nov. 1984 Nov. 1984 p 1-14 In JAPANESE (For primary document see N85-27022 16-31)
Avail: NTIS HC A04/MF A01

The career of the author is traced from graduation from Tohoku University onward. He was a member of the Communication Engineering Department at the University. Various highlights are mentioned from the design of a transformer up to an award for an equivalent transformation for mixed lumped and distributed circuits. Transl. by B.G.

N85-27024# Tohoku Univ., Sendai (Japan). Research Center for Applied Information.
PROPOSAL OF A METHOD FOR EVALUATING ACCURACY OF ESTIMATED IMPULSE RESPONSE OF A SYSTEM c33
Chun-Duck Kim (Busan Univ., Korea) and Keniti Kido *In its* The Record of Elec. and Comm. Eng. Conversazione, Vol. 53, No. 2, Nov. 1984 Nov. 1984 p 15-23 refs In JAPANESE; ENGLISH summary (For primary document see N85-27022 16-31)
Avail: NTIS HC A04/MF A01

A new method for evaluating the accuracy of estimated impulse response of a system is proposed and its effectiveness is shown by discussion of the computer simulation comparing it with the conventional methods. The accuracy of the estimated impulse response is evaluated by the following procedure: The system is driven by computer generated white noise and the response of system to it is observed. Then the convolution between the estimated impulse response and the driving white noise is computed to obtain the estimated response of the system. The difference between the computed response and the measured response is squared at every sampling time. The ratio between the sum of the squared difference and the sum of the squared sample values of the measured response is computed. This ratio is used for the evaluation. Author

N85-27025# Tohoku Univ., Sendai (Japan).
THE DESIGN OF AN ENGLISH WORD-PROCESSOR FOR SCIENTIFIC AND TECHNICAL USE IN WHICH SUPERSCRIPTS, SUBSCRIPTS AND GREEK CHARACTERS ARE OPERATED BY SCREEN-EDIT. 3 c32
Junichi Mashiko, Susumu Mashiko, and Shigetoshi Katsura *In its* The Record of Elec. and Comm. Eng. Conversazione, Vol. 53, No. 2, Nov. 1984 Nov. 1984 p 24-37 refs In JAPANESE and ENGLISH (For primary document see N85-27022 16-31)
Avail: NTIS HC A04/MF A01

A software for microcomputers FM8 and PC8822 which allows writing of supercripts, subscripts, and Greek characters by screen edit was created. The software was adopted for the use on FM7 and FM11. Printers were 8-dot serial dot printer MB27406 for FM7 and 24 dot Kanji printer MB2740 for FM11. A light pen was used to facilitate the pattern creation. To the preexisting 13 commands, 5 were added. The entire 18 (auto, edit, print display, print printer, print list, load, delete, renumber, beep, pattern package name, files, free byte, merge, help, end or initialize, and parameter) are described in detail. A new program was created to enable the use of a light pen. It is in an assign format in which FONT data are allocated after editing to an appropriate package. Pattern edit commands are described in detail with the aid of an EDIT flow chart. In the appendix, examples are given to describe input and output of supercripts, subscripts, and Greek letters using the present system, (computer program, word processing, superscripts, subscripts, Greek letters, microcomputers). Transl. by B.G.

N85-27026# Tohoku Univ., Sendai (Japan).
ON GRAVITATIONAL WAVES c46
Jiro Chiba *In its* The Record of Elec. and Comm. Eng. Conversazione, Vol. 53, No. 2, Nov. 1984 Nov. 1984 p 38-49 refs In JAPANESE; ENGLISH summary (For primary document see N85-27022 16-31)
Avail: NTIS HC A04/MF A01

Gravitational wave is produced whenever massive bodies accelerate under gravitational or nongravitational driving forces. The equations of Einstein's general theory of relativity have solutions in the weak field approximations which are very similar to those of electrodynamics. Analogies may be made between gravitational radiation and the electromagnetic radiation from accelerated charges although care has to be taken to recognize the limitations of such analogies. Because of the weakness of the Einstein's qravitational constant, the rate of energy radiated is normally very small. It is very desirable to be able to generate dynamic Newtonian gravitational field with sufficient intensity to be detected in the small laboratory. Experimental techniques used in generation and detection of dynamic Newtonian gravitational fields are reviewed and their application to Morse code communication in very near zone, as one approach to the gravitational wave technology. Author

N85-27027# General Dynamics/Fort Worth, Tex.
INITIAL QUALITY OF ADVANCED JOINING CONCEPTS Final Report, Jun. 1980 - Dec. 1983
W. R. Garver, D. Y. Lee, and K. M. Koepsel Wright-Patterson AFB, Ohio AFWAL 12 Dec. 1984 188 p
(Contract F33615-80-C-3226)
(AD-A152241; AFWAL-TR-84-3066) Avail: NTIS HC A09/MF A01 CSCL 11/1

This initial fatigue quality of three types of aircraft construction were studied. The three types included conventional mechanically-fastened joints, adhesively-bonded joints, and monolithic aluminum castings. The objectives are to obtain data for setting initial flaw assumptions for U.S. Air Force damage tolerance specifications, and to develop a method for comparing the relative merit of competing structural concepts. Two hundred test elements representing these joining concepts were prepared and tested under realistic spectrum load histories. Nondestructive inspections were performed on all specimens, but no correlation to crack growth performance was found. Crack growth data were obtained by fractographic examination and analyzed using the equivalent initial flaw size (EIFS) concept. Statistical distributions, representing the variation in EIFS and in crack growth rate, were obtained. Adhesively-bonded structure was found to give the best overall combination of benefits. The scatter in crack growth was highest in castings, which limits reliability at high stresses. An improved methodology was developed for comparing structural performance and efficiency. The methods include consideration of initial material and manufacturing quality, and can be used to quantify reliability at any confidence level and service time. GRA

N85-27028# Ballistic Research Labs., Aberdeen Proving Ground, Md.
A REVIEW OF SAFETY PRACTICES AND SAFETY TRAINING FOR THE EXPLOSIVES FIELD
J. Hershkowitz Feb. 1985 125 p
(DA Proj. 1L1-61102-AH-43; DA Proj. 1L1-62618-AH-80)
(AD-A152295; AD-F300588; BRL-TR-2635) Avail: NTIS HC A06/MF A01 CSCL 13/12

Various safety practices and the content of selected training programs emphasized at several major installations involved with explosives and explosive devices are reported herein. The report is divided into independent sections, each of which addresses a commonly encountered facet of explosives safety. Supplemented by a safety file consisting of regulations, references, documents, videotapes, and cassettes (all listed in an appendix) and suggestions for presentation and demonstrations (also included as an appendix), the report can be used as the basis for a modular training course. It is being used in this mode by the Ballistic Research Laboratory (BRL) in the production of a video training

tape which, ultimately, will be made available to those working in the field of explosives. Although the report provides the reader with a comprehensive view of many of the safety practices currently in use at representative installations, it is not an endorsement of any of the safety practices described nor does it supersede existing safety regulations at any installation. In all cases, the safety regulations at the individual installations continue in effect until formally altered. GRA

N85-27029# Bendix Corp., Kansas City, Mo.
MEASUREMENT CAPABILITIES OF THE BENDIX METROLOGY ORGANIZATION
L. M. Barnes Jan. 1985 64 p
(Contract DE-AC04-76DP-00613)
(DE85-005795; BDX-613-3024-Rev) Avail: NTIS HC A04/MF A01

The purpose is to communicate the measurement and calibration capabilities of the Metrology Organization of the Bendix Kansas City Division. Included is a listing of the measurement types and ranges available, and the accuracies normally attainable under conditions at the Kansas City Division. Also described are currently used standards and measurement devices. DOE

N85-27030# Universidad Nacional Autonoma de Mexico, Mexico City. Inst. de Investigaciones en Materiales.
OPERATION OF A LOW TEMPERATURE ABSORPTION CHILLER AT RATING POINT AND AT REDUCED EVAPORATOR TEMPERATURE Final Report
Roberto Best, Wendell Biermann (Carrier Corp.), and Robert Reimann (Carrier Corp.) Jan. 1985 22 p
(Contract DE-AC03-83SF-11905)
(DE85-006308; DOE/SF-11905/T1) Avail: NTIS HC A02/MF A01

The returned fifteen ton Solar Absorption Machine (SAM) 015 chiller was given a cursory visual inspection, some obvious problems were remedied, and then it was placed on a test stand to get a measure of dirty performance. It was then given a standard acid clean, the water side of the tubes was brushed clean, and then the machine was retested. The before and after cleaning data were compared to equivalent data taken before the machine was shipped. The second part of the work statement was to experimentally demonstrate the technical feasibility of operating the chiller at evaporator temperatures below 0(0)C (32(0)F) and identify any operational problems. DOE

N85-27031# Brookhaven National Lab., Upton, N. Y.
MEASUREMENT OF NSLS DISTRIBUTED DIODE SPUTTER ION PUMP CHARACTERISTICS
C. L. Foerster 1984 16 p refs Presented at the 31st Natl. Symp. of the American Vacuum Society, Reno, Nev., 4-7 Dec. 1984
(Contract DE-AC02-76CH-00016)
(DE85-06550; BNL-35940; CONF-841218-25) Avail: NTIS HC A02/MF A01

For the DI pump to have acceptable pumping speed, the pump must be glow discharge conditioned after the 150 C max vacuum bakeout. Other DI pump conditioning procedures have not been investigated. Glow discharge conditioning of the system using the DI pump anode significantly improves the pumping speed at low pressures and high pressure pumping speed is slightly improved. The NSLS DI pump speed is not linear with pressure even though the average current is. Pumping speed drops to less than 25% of the high pressure speed at pressures below 10(-9) torr, depending on the pump condition. The pumping speed is sufficiently close to its calculated value at high pressure. These results agree with actual ring experience with the distributed pump. The DI pump is most efficient pumping distributed gas loads from beam operation rather than gas loads introduced at the ends of the pump. Most of the gas load is distributed adjacent to the pump during beam operation due to synchrotron radiation included desorption. DOE

N85-27032# Institut Franco-Allemand de Recherches, St. Louis (France).
INFLUENCE OF BEHAVIOR LAWS IN THE EXPLOSIVE DEFORMATION OF METAL PLATES Final Report [INFLUENCE DE LA LOI DE COMPORTEMENT DANS LA DEFORMATION PAR EXPLOSIF D'ASSIETTES METALLIQUES]
G. Gazeaud 8 Aug. 1983 38 p refs In FRENCH
(ISL-R-122/83) Avail: NTIS HC A04/MF A01

Numerical simulations obtained with the HEMP two dimensional code were performed to study projectile shapes obtained by explosive forming. The results for a simple perfect elastoplastic behavior are given. The deformation velocities and the external shape of the projectile are obtained with good agreement. The location of the rupture is also forecast, but the breaking time is more difficult to determine. Author (ESA)

N85-27033# Environmental Sciences Research Lab., Research Triangle Park, N.C. Atmospheric Sciences Research Lab.
EMISSION INVENTORY APPLICATIONS TO REGIONAL ACID DEPOSITION MODELING
Joan H. Novak Jan. 1985 7 p refs
(PB85-157386; EPA-600/D-895-017) Avail: NTIS HC A02/MF A01 CSCL 13B

A comprehensive Regional Acid Deposition Model (RADM) is being developed and a simpler fast-turn-around engineering model(s) (EM) is being designed by the National Center for Atmospheric Research as part of the National Acid Precipitation Assessment Program (NAPAP). How potential assessment applications and research questions affect those model designs and the subsequent emission inventory requirements is examined. Finally a recommendation is made for EPA to consolidate inventory development efforts to produce an agency emission inventory applicable to the wide spectrum of models and applications throughout EPA. GRA

N85-27034# National Bureau of Standards, Gaithersburg, Md. Center for Fire Research.
SIGNIFICANT PARAMETERS FOR PREDICTING FLAME SPREAD
James G. Quintiere Feb. 1985 13 p
(PB85-178002; NBSIR-85/3109) Avail: NTIS HC A02/MF A01 CSCL 21B

Flame spread is considered on a vertical wall surface in a vented enclosure. A theoretical formulation is developed to describe the burning and fire spread behavior and its response to the changing environmental conditions of the room. These formulations were kept simple in form, but consistent with current levels of accuracy and completeness. The primary aim was to establish the relevant and significant set of dimensionless parameters which govern the fire spread process. These are given in terms of room geometric factors and wall flammability properties. No solution of the equations was developed. Author

N85-27035# Joint Publications Research Service, Arlington, Va.
USSR REPORT: ENGINEERING AND EQUIPMENT Abstracts Only
6 Aug. 1984 94 p Transl. into ENGLISH from various Russian articles
(JPRS-UEQ-84-006) Avail: NTIS HC A05/MF A01

Abstracts of articles addressing various topics in engineering, manufacturing, and equipment are presented. Subject areas include nuclear and non-nuclear energy technology, industrial technology, turbines, guidance and control systems, optical equipment, fluid mechanics, structural dynamics, and testing and materials. For individual titles, see N85-27036 through N85-27070.

N85-27036# Joint Publications Research Service, Arlington, Va.
SOLAR ELEMENTS WITH DISTRIBUTED PARAMETERS Abstract Only c44
Kh. K. Aripov, V. D. Rumyantsev, and A. F. Ioffe *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 11 refs Transl. into ENGLISH from Geliotekh. (Tashkent, USSR), no. 5, Mar. 1983 p 3-6 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

The theoretical construction and experimental verification of universal equations describing the effectiveness of photoelectric conversion and photocurrent over a broad range of light levels, extending into deep saturation of the solar elements are discussed. The measure of effectiveness is the ratio of electric power generated by a solar cell at the optimal load point to the maximum power which would be generated at the same light level with no internal ohmic losses. Solar cells with a p-n junction made of GaAs with an AlGaAs surface structure were used for experimental confirmation of the curves generated by the theoretical equations. Good agreement between theoretical and experimental data confirms the possibility of practical utilization of the equations derived to predict the behavior of solar cells of various configurations offer a broad range of light levels. Author

N85-27037# Joint Publications Research Service, Arlington, Va.
STRUCTURAL DESIGN AND KINEMATIC CONFIGURATION OF TWO-ARMED ROBOTS Abstract Only **c37**
I. I. Pavlenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 18 Transl. into ENGLISH from Vest. Mashinostroyeniya (Moscow), no. 12, Dec. 1983 p 5-9 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

It is best to determine the structural design and kinematic variants of two-armed robots without considering the degrees of mobility of the kinematics of the base or the degrees of mobility common to the kinematically coupled arms or the kinematics of the wrists, since these motions comprise separate kinematic groups to be analyzed independently. The structural configurations of two-armed robots are those which are distinguished by distribution of the degrees of mobility between the arms, the composition of the kinematic pairs, the kinds of motions they can execute and the relative positioning with respect to each hand. Five degrees of mobility for the robot arms with nine different variants of the distribution of degrees of mobility between the arms are defined and the possible configurations of the kinematic pairs are analyzed. The options are summarized in tabular form and a set of schematic drawings. The proposed approach makes it possible to select the most standard and acceptable kinematic variants for two-armed robots from a set of possibilities and can also be extended to the analysis of kinematic configurations for multi-armed robots. The purely theoretical treatment adduces no specific calculations or examples of designs or hardware. Author

N85-27038# Joint Publications Research Service, Arlington, Va.
EXPERIENCE WITH INTRODUCTION OF FINISH PERFORATION OF PRECISION PARTS FOR OPTICAL INSTRUMENTS Abstract Only **c37**
N. S. Vishnevskiy, Yu. N. Neugomonov, and V. V. Mazitov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 18-19 refs Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 37-40 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Finish perforation of precision parts has been introduced in an enterprise which produces binoculars and other optical instruments with general-purpose and special-purpose manufacturing equipment. The perforating machine is a 400 kN model K234 can press with GKP-F-50/80 Feintool (Swiss) automation. The press can be set up for perforating blanks of carbon steels with 0.2 to 0.8% C (grades 10kp, U8A, 20, 40, 50) brass (grade L63T), or aluminum alloy (grade D1AT) 8 to 50 mm long, 4 to 50 mm wide, 46 mm in diameter, and 0.8 to 5.0 mm thick. The product quality was evaluated on the basis of standard mechanical tests (hardness, yield strength, ultimate strength, ductility) and microstructural analysis. The results revealed effects of heating and heat treatment during punching, in terms of phase transformation and redistribution. Recommendations were made on this basis concerning punch and die design as well as method of operation for optimum condition of cut surface and minimum possible corner radius. For production volumes below 100,000 pieces, updating the general-purpose press is recommended, although it will produce only 6,000 to 7,000 pieces in one work shift, which is economically preferable to installing a much more costly special-purpose triple-action press. Author

N85-27039# Joint Publications Research Service, Arlington, Va.
CALCULATING RELIABILITY AND PRODUCTIVITY OF COLD STAMPING ROBOT COMPLEX AS QUEUING SYSTEM Abstract Only **c37**
L. G. Stepanskiy and M. A. Kryuchkov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 19 refs Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 36-37 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

A robotic complex for cold stamping is considered which includes either two industrial robots or one industrial robot with two hands, one for feeding parts to the press and one for dumping parts from the press. Its reliability and productivity are calculated by treating it as a queuing system. The probabilities of correct operation are evaluated on the basis of time parameters characterizing the cold stamping process, likely losses of time, and failure statistics. The results are extended to a complex consisting of k presses and 2k industrial robots or k two-hand industrial robots, also k- 1 conveyers transporting parts from one press to the next. Such a system is treated as a (4k- 1)-phase queuing system with failures and one channel or as a 3K-phase queuing system when conveyers are excluded. General formulas are applied to a complex with a Tsiklon-3B two-hand industrial robot for a press which delivers a mean number of 24,000 punches between failures with 700 piston strokes per hour. For the same example, the increase of overall productivity that would result from increasing the productivity of the input conveyer by 30% was calculated. The productivity of the robot complex is found to increase by 8% from its original 211 pieces/h. Author

N85-27040# Joint Publications Research Service, Arlington, Va.
METHOD OF SELECTING ROBOTIZED SYSTEM DESIGN FOR PRESSING PROCESS Abstract Only **c37**
N. A. Arkhipenko and N. F. Kravchenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 20 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 34-36 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

The robotized system design depends on the type of industrial robot and on the functions it is to perform and on the composition and the arrangement to the manufacturing tools. The selection procedure for a pressing process is demonstrated and seven different robotic complex designs and five different robot line plans are considered. There performance characteristics are quantified for two economic indicators: annual cost saving and length of investment recovery period. The annual cost saving is calculated for each eligible robot design and the selection is made accordingly. Numerical calculations were made by this method for the bending process of thick braces weighing not more than 0.2 kg in a K-117A press with an industrial robot. Industrial robots with low load capacity and with a higher load capacity are considered. E.A.K.

N85-27041# Joint Publications Research Service, Arlington, Va.
EXPERIENCE OF SHEET STAMPING ROBOTIC COMPLEXES Abstract Only **c37**
V. M. Kirasirov, N. N. Kuznetsov, Yu. S. Pochtar, and N. V. Travkin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 20-21 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 31-33 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

The general concept and organization of a sheet stamping robotic complex are described, with one industrial robot for one press and several special-purpose machine tools serving as example. The layout of production machinery with a model PR-10S industrial robot for producing cowls of various sizes and intricate shapes from blank disks is shown, from the beginning to the last finishing operation. This machinery includes a model P6328

hydraulic press, a model SZK-2VM facing tool, a model PD-1 piercing tool, and a stapler. The automatic manipulator has specially constructed feeder and gripper mechanisms. It operates with the machine tools sequentially, according to requirements of the manufacturing process, through feedback control which also includes safety measures with use of verification signals and appropriate interlocking. This complex replaces four workers in stamping and mechanical processing operations and replaces piecewise processing of blanks with a conveyor-belt line. E.A.K.

N85-27042# Joint Publications Research Service, Arlington, Va.
AUTOMATIC MANIPULATORS FOR FORGING ROLLERS Abstract Only **c37**
F. A. Gladkov, A. M. Ryabov, V. A. Sazonenko, G. I. Sklyarova, and V. N. Sokolov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 21 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 29-31 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Two automatic manipulators MKV-50 and MKV-16 for hot rolling mills were developed. These program controlled automatic manipulators, with respective load capacities of 50 kg and 16 kg, feed ingots from hoppers to multipass rolls and dump the product into bins. The servomechanism of each consists of a hand mounted on bearings in a case-carriage, the hand moving long the carriage and the latter moving parallel to the rollers. Each hand is coupled to a planetary gear mechanism through a power pack, a strap, a driving lever, and a connecting rod, and to a cylinder about whose axis it rotates. Each automatic manipulator features a centralized fluid supply system for all its servocylinders and a centralized lubrication system for all its friction couples. Its extensive program control is based on a standard UTsM663 memory storing the entire control algorithm, with provisions for manual control before start. An experimental MKV50 prototype was tested in an AKS-V1237 robotic complex. E.A.K.

N85-27043# Joint Publications Research Service, Arlington, Va.
UPDATING MODEL RPD-1.25 INDUSTRIAL ROBOT Abstract Only **c37**
L. B. Sachkov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1985 p 21-22 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 27-29 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

The model RPD1.25 industrial robot was developed. This model incorporates new features in individual components and in the overall layout of the manipulator. The hands rotate clockwise and counterclockwise about their vertical axes and up and down, each tong can move forward and backward along the hand axis, and the tong of the lower hand can also rotate about the hand axis. The hands are mounted so that they can remain in almost any position, at any angle, relative to the manipulator body. The rotating mechanism consists of a rotary piston engine with pinion. The lifting mechanism consists of a pneumohydraulic cylinder with bushing, regulating screws, and hydraulic cushions. The manipulator is mounted on the floor through four adjustable bolts so that its height above the floor can be varied by as much as 80 mm. Its mechanisms are enclosed for protection against dust, dirt, and foreign objects. The industrial robot is controlled by standard UTsM-663 hardware, it operates two presses on the model L16 assembly line replacing the old model RTU2.KD2124Ye robot complex. E.A.K.

N85-27044# Joint Publications Research Service, Arlington, Va.
INDUSTRIAL ROBOTS AND AUTOMATIC MANIPULATORS FOR FORGING AND PRESSING OPERATIONS AT SECOND INTERNATIONAL EXHIBITION Abstract Only **c37**
R. K. Dezhurov and N. V. Koloskov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 22 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 25-27 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Industrial robots produced by 32 manufacturers in 12 countries, more than 120 models for casting, forging and pressing, metal treatment, semifinishing, transport, assembly, painting, and other operations were displayed. The exhibits included hydraulic, pneumatic, and electric drive accessories for all these industrial robots. Outstanding among the automatic manipulators were the Andromat from France for drop forging, horizontal forging and pressing, putting blanks into furnace and taking blanks out of furnace, and four automatic manipulators from Austria: the SM for forging wheels, the SMES for forging rails, the ZM for transporting, and the hydraulic SMA for forging rods and barrels as well as for rough forging. The MARK II/III/IV/V automated centers from the United States for coining coiled sheet, coining flat strip multiposition coining of individual blank pieces, and cold stamping respectively are also discussed. These centers operate with a pacer assembly line. E.A.K.

N85-27045# Joint Publications Research Service, Arlington, Va.
NEW STAGE IN ROBOTICS DEVELOPMENT Abstract Only **c37**
Ya. A. Shifrin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 25-26 refs Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 13-14 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

While the number of industrial robots operating in the instrument manufacturing industry is to increase to 40,000 robot complexes will soon be commercially built for hot stamping of items up to 6.3 kg and 40 kg in weight. An important factor facilitating this trend is changeover to flexible production systems with attendant improvement of productivity and cost effectiveness, in terms of capital outlays for construction and installation. The scientific-procedural council is overseeing this transition and is enlisting the efforts of appropriate scientific research institutes and design offices to ensure that it proceeds most efficiently and reliably. Author

N85-27046# Joint Publications Research Service, Arlington, Va.
NON-CONTACT HYDROSTATIC BEARINGS Abstract Only **c37**
M. A. Shimanovich *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 26 refs Transl. into ENGLISH from Mashinostritel (Moscow), no. 12, Dec. 1983 p 19 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

By eliminating contact between working surfaces, hydrostatic bearings improve the precision and output of the polishing process, as well as the quality of polished articles. The superior damping capacity of hydrostatic bearings makes it possible to relax the requirements for the polishing wheels and their balancing at speeds of up to 120,000 rpm, as well as to increase the service life of the grinding wheels and truing diamond tools. Series production of high power automatic grinding machines with hydrostatic arbor bearings and shaft guides has been initiated. A description is provided of the typical construction of hydrostatic guides 2-3 meters long for tables weighing several tons. Author

N85-27047# Joint Publications Research Service, Arlington, Va.
CONTROL OF MOTION OF MANIPULATOR ROBOTS ON BASIS OF FIRST-ORDER KINEMATIC ALGORITHMS Abstract Only **c37**
P. D. Krutko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 26-27 refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Mashinostr. (Moscow), no. 9, Sep. 1983 p 46-52 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Servomechanisms with kinematics describable by the equation X(t)+F q(t) X = //xsub1xsub2xsub3// to the T and q=// qsub1qsub2qsub3// to the T are considered for controlling the motion of manipulator robots. The vector function F/q(t)/ of kinemetic variables q characterizing the relative positions of

mechanism components is assumed to determine S(t) uniquely at any instant of time and to have partial derivatives with respect to q. Author

N85-27048# Joint Publications Research Service, Arlington, Va.
ELECTRIC MOTORS WITH ELASTICALLY MOUNTED ROTORS Abstract Only **c33**
D. A. But and N. I. Kulikov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 27-28 Transl. into ENGLISH from Elektrichestvo (Moscow), no. 9, Sep. 1983 p 29-34 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Motors with a conical motion of the shaft suitable for applications in mixers, medical equipment and robotics are analyzed. The rotor is made in the form of a disk with a ferromagnetic active region and a shaft running through the center of the disk. The free end of the shaft is connected to the mechanical load. The rotor is held by a flexible support, which is a rubber bushing, bellows, coiled spring, etc. The magnetic cores with the windings are arranged around the stator periphery, adjacent to the end faces of the disk at axial working gaps. The upper and lower cores are mounted on a common steel frame. The windings are powered through controlled rectifiers, switched so as to drive the disk to oscillatory wave-like motions. Various configurations of such motors are discussed and analytical expressions are derived for disk acceleration, rpm and average magnetic force on the disk. The theory is illustrated with sample calculations for an approximately 30 W motor running at 600 rpm with an efficiency of 0.576 weighing about 8 kg. Author

N85-27049# Joint Publications Research Service, Arlington, Va.
OPTIMAL CONTROL OF ELECTRIC DRIVE WITH SIMULTANEOUS CONTROL INPUTS FOR MOTOR CURRENT AND FLUX Abstract Only **c33**
V. I. Pansyuk *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 28 refs Transl. into ENGLISH from Elektrichestvo (Moscow), no. 9, Sep. 1983 p 35-38 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

A detailed mathematical analysis of the optimal control of a dc electric drive with a variable magnetic flux is presented. Expressions are found for the optimal controller. When this controller uses real time microprocessors control hardware, formulas are also derived for the various portions of the optimal process as well as the logic expressions for the switching of these parts of the process. The resulting optimal process differs from previous determinations in that the braking portion, when a resistance moment is present, contains a free run-down (passive braking) region, before and after which there can be regions of active braking, when the motor produces an electromagnetic moment. In one numerical example of step dc motor control, which is used to compare the optimal process found here with one developed earlier, power losses are found to be reduced by 5.44% with the new process. The entire solution of the problem using the procedure presented here reduces to finding the conditional extremum of some function of several variables whose number is no greater than the dimensionality of the system and does not lead to a boundary value problem. Author

N85-27050# Joint Publications Research Service, Arlington, Va.
ESTIMATES OF ERRORS OF A GYROSCOPE STABILIZED PLATFORM Abstract Only **c35**
A. V. Zbrutskiy and I. V. Balabanov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 41 Transl. into English from Prikladnaya Mekhan. (Kiev), no. 9, Sep. 1983 p 125-128 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

A gyrostabilized platform has a four-frame cardan suspension in which one of the dynamically adjusted gyroscopes placed on the stabilized platform measures the angle of its deviation in the plane of the platform, while the second such gyroscope measures the deviation relative to this plane. The redundant first gyro can be used to correct the system and may also be a closed system itself. This paper studies the errors in the gyro stabilized platform due to the nonperpendicularity of the axes of the cardan suspension of the platform due to the nonperpendicularity of the axes of the cardan suspension of the platform as well as the disbalance of the components and dynamically adjustable gyroscopes. The cumbersome equations of motion for the system are written, neglecting dry frictional forces in the shafts of platform suspension, second order nonlinearities relative to the angular coordinates and their derivatives as well as terms with periodic coefficients which can affect the dynamics of the platform only in narrow ranges of frequency variations at parametric resonances. B.W.

N85-27051# Joint Publications Research Service, Arlington, Va.
ERRORS IN COMPENSATING FOR IMAGE OSCILLATION BY MEANS OF A GYROSCOPIC HEAD Abstract Only **c35**
A. V. Torochkov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 42 Transl. into ENGLISH from Tekh. Kino i Televideniya (Moscow), no. 12, Dec. 1983 p 22-24 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Gyroscopic systems can be used to compensate the shifts of an image on motion picture film due to oscillations of the camera. The major task of such correcting systems is the measurement of the natural oscillations of the motion picture camera and the appropriate compensating rotations of the optical elements based on these measurements, so as to cancel the motions of the camera itself. This paper analyzes the error occurring when compensating for image oscillations as a function of the camera system parameters by introducing the concept of a compensation function. This function is expressed as the ratio of the function describing the harmonic motion of the gyroscope to a similar function for the harmonic oscillations of the camera. The theoretical treatment is illustrated using the transfer function of the gyroscopic compensation system manufactured by the Arnold and Richter company. The compensation function is plotted in turn as a function of the frequency of the harmonic oscillations of the image for various values of the time constant, t, in the transfer function of the correcting system. B.W.

N85-27052# Joint Publications Research Service, Arlington, Va.
HOLOGRAPHIC LENS FOR OPTICAL CORRELATOR Abstract Only **c35**
G. B. Semenov, S. N. Koreshev, A. V. Pavlov, and Ye. I. Shubnikov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 46-47 Transl. into ENGLISH from Opt. i Spektrosk. (Lenningrad), v. 55, no. 5, Nov. 1983 p 945-949 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Aberrations in holographic optics place limitations on the information capacity of the data that can be processed by holographic optical correlators. Nonetheless, the aberrations can be reduced sufficiently for an extensive class of devices such as those for real time data input using space-time light modulators and a TV channel. This paper analyzes the aberrations of holographic lenses, demonstrating the feasibility of an off-axis lens for correlation image analysis with aberrations similar to an axial lens. A requirement that the wave aberrations not exceed a quarter-wavelength was placed on the lens. Equations are solved for coma and astigmatism, and used to plot the maximum wave aberrations as a function of the spatial frequency of the proposed signal for three cases: (1) normal propagation of a diverging beam and oblique propagation of a plane beam; (2) oblique propagation of diverging and parallel beams, symmetrical with respect to the normal to the photographic plate; (3) oblique propagation of the diverging beam and normal propagation of the parallel beam. The angle between the beam axes was 45 deg in all cases, with a lens focal length of 350 mm and an operture of 32 mm. B.W.

N85-27053# Joint Publications Research Service, Arlington, Va.
IMPACT OF OPTICAL INHOMOGENEITY IN SINTERED INTERFACE BETWEEN GLASSES ON LASER EMISSION CHARACTERISTICS Abstract Only **c36**
A. G. Murzin, N. A. Soldakova, V. A. Fromzel, and A. D. Tsvetkov

In its USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 47-48 Transl. into ENGLISH from Opt. i Spektrosk. (Moscow), v. 55, no. 5, Nov. 1983 p 940-944 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

This paper details an experimental study of the influence of the optical inhomogeneities produced during the sintering process in the interface on the spatial and energy parameters of neodymium laser emissions when the sintered boundary is located inside the cavity perpendicular to its optical axis. Three samples of phosphate glass 10x20x30 mm were prepared by sintering together two pieces at a viscosity of 10 to the 9th power -10 to the 8th power. Following the polishing of the outer surfaces of the samples, the deformation of the sintered surfaces were determined using a Mach-Zehnder interferometer. Photographs of the interference patterns from the interfaces clearly show various maximum deviations from the desired surface of between 0.32 mm and 1.6 mm, due to optical inhomogeneities. Two kinds of optical inhomogeneities can be produced in the interface during sintering: small-scale ones, related to the presence of dust particles, inclusions, etc., and large scale inhomogeneities, related to the plastic deformation of the glass being joined. B.W.

N85-27054# Joint Publications Research Service, Arlington, Va.
MIRROR ACCESSORY FOR LINE STRAIGHTENING IN DIFFRACTION SPECTROMETERS Abstract Only c74
V. M. Kelman and I. V. Rodnikova *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 48 refs Transl. into ENGLISH from Izv. Akad. Nauk Kaz. SSR, Ser. Fiz.-Mat. (Alma-ATA, USSR), no. 6, Jun. 1984 p 76-79 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Spectrometers with diffraction gratings have the inherent defect of bending the spectral lines, which is due to the oblique path of the rays from the portions of the slot source above and below the optical axis of the system. This distorting curvature can be substantially reduced by means of incorporating in the optical path an accessory for the grating, which takes the form of a telescopic system of two cylindrical mirrors. In the case of a monochromator with a plane grating, the plane of symmetry of both of the cylindrical mirrors, parallel to their generatrices, and the main cross-section of the grating are collocated and form the central plane of the monochromator, which coincides with the plane of a drawing showing the ray paths. Analytical expressions are derived for the rectification of the ray paths and applied in a sample calculation to a monochromator in which the diffraction grating was rotated through 30 and had 1,200 lines/mm; the telescopic system of cylindrical mirrors consisted of a convex mirror (f = 210 mm) and a concave mirror (f = 280 mm). Precise calculations of the curvature of the lines are summarized in tabular form for two cases. B.W.

N85-27055# Joint Publications Research Service, Arlington, Va.
OPERATION OF AUTOTRACKING SYSTEM IN VARIOUS VIDEO PLAYBACK MODES Abstract Only c35
V. G. Soshnikov, G. V. Fridlyand, and L. V. Fridlyand *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 49 refs Transl. into ENGLISH from Tekh. Kino i Televideniya (Moscow), no. 12, Dec. 1983 p 43-47 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Video tape recorders using oblique line scanning heads have the capability of accelerating or slowing down the playback relative to the nominal speed. The video signal quality is determined to a considerable extent by the operation of the autotracking system. The basis of the ATS is the circuitry which matches the trajectory of the magnetic playback head on the tape surface with the recorded line at the nominal playback speed. This so-called nominal playback matching circuit must incorporate additional devices to speed up or slow down the playback. The development of a video tape recorder with the autotracking system (ATS) is discussed. Block diagrams of the system and its components are supplemented with traces of the various control voltages and circuit responses, as well as a drawing of the trajectories of the magnetic head for various special effect modes. A piezoelectric transducer is used to shift the head relative to the record track to produce stop-field, stop-frame or other special effects. It is indicated that such VTR ATS circuits are capable of slowing or accelerating the playback by a factor of 5 to 10 times the nominal speed. B.W.

N85-27056# Joint Publications Research Service, Arlington, Va.
APPROXIMATE SOLUTION OF THE PROBLEM OF FLUID OSCILLATIONS IN CAVITIES OF REVOLUTION Abstract Only c34
V. L. Shetukhin and V. P. Shmakov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 50 Transl. into ENGLISH from Prikl. Mekh. (Kiev, USSR), no. 9, Sep. 1983 p 91-95 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

A vessel is formed by a surface of revolution having an axis of symmetry collinear with the gradient of the mass force field. This cavity is partly filled with fluid. This paper develops an efficient approximation algorithm for determining the natural frequencies and modes of the fluid oscillations, including the higher harmonics. The solution applies to cavities with considerable elongation and those in which the free surface area falls off as the relative fluid depth increases. The approach is illustrated with an analysis of the fluid oscillations in spherical, conical and cylindrical cavities with spherical bottoms. The treatment of these cases shows that the method has good computational stability and applies to cases when the free surface of the fluid is smaller than the wetted surface of the cavity. For cavities in which the free surface area decreases with an increase in the relative fluid depth, the method can be used to find the upper and lower bounds of the true values of the natural frequencies. B.W.

N85-27057# Joint Publications Research Service, Arlington, Va.
TURBULENT FLOW OF FLUID NEAR TRAILING EDGE OF PLATE IN STREAM AT ZERO ANGLE OF ATTACK c34
S. A. Velichko and Yu. B. Lifshits *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 51 Transl. into ENGLISH from Izv. Akad. Nauk, Mekh. Zhidkosti i Gaza (Moscow), no. 6, Jun. 1983 p 17-23 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

The problem of turbulent flow at the trailing edge of a plate, in a stream of incompressible fluid at zero angle of attack, is solved by the method of asymptotic expansions and their collocation. Boundary conditions of adhesion are replaced with the condition of axial symmetry in the wake, which results in a different gradient of the displacement thickness and a longitudinal pressure gradient so large as to invalidate the boundary-layer approximation. A theory is constructed that describes the interaction of wake and boundary layer, with the former assumed to be the only source of perturbations in the latter. The velocity field, its longitudinal and transverse components, as well as the pressure field and the turbulent shearing stress are calculated from the corresponding differential equation of momentum for the appropriate boundary conditions, taking into account that the flow function is antisymmetric in the wake region and assuming a power-law velocity profile in the unperturbed state. The solution is sought in self-adjoint form, with a Fourier integral, and found to contain Gauss's hypergeometric function, which can be evaluated with the aid of the GOURSAT quadratic transformation. Author

N85-27058# Joint Publications Research Service, Arlington, Va.
OPTIMUM GEOMETRY OF INTERBLADE PASSAGES IN IMPELLERS OF THERMOMOLECULAR VACUUM PUMP Abstract Only c34
K. Ye. Demikov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 51-52 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Mashinostr. (Moscow), no. 12, Dec. 1983 p 66-69 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Certain performance parameters of turbomolecular vacuum pumps, namely the maximum pressure ratio tau(max) at equal

opposing molecule fluxes and the maximum probability of molecule transfer of suction K(max) under equal pressures on both sides, depend largely on the geometry of the interblade passages in the impellers. A composite universal relation was established for determining the slant angle of interblade passages or blade generatrices as well as the relative aperture or closure of the passage exit section. This exponential relation between pressure ratio tau and probability of molecule transfer K is tau = ae(sup bK)+c, where the empirical constant alpha b,c are determined from known or given tau(max,n) and K(max,1). This relation is based on an exact solution of the problem of minimizing the number of impellers (n) and optimizing the interblade passage on the suction side. Author

N85-27059# Joint Publications Research Service, Arlington, Va.
FLOW AROUND ROTATING AND NONMOVING CIRCULAR CYLINDER NEAR FLAT SCREEN. REPORT 1: AERODYNAMIC FORCES IN CYLINDER Abstract Only **c02**
V. M. Kovalenko, N. M. Bychkov, G. A. Kisel, and N. D. Dikovskaya *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 52-53 Transl. into ENGLISH from Izv. Sib. Otd. Akad. Nauk SSSR, Ser. Tekhn. Nauk (Novosibirsk, USSR), ser. 3, no. 13, Oct. 1983 p 50-59 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

The major aerodynamic characteristics of a rotating and nonmoving circular cylinder near a flat screen, primarily in the area of critical Reynolds numbers were investigated. Tests were performed in a subsonic wind tunnel, the ITPM T-324 with a 1 x 1 m cross section and a length of 4 m. The lift and drag of rotating and nonrotating cylinders are computed. It is shown that the aerodynamic characteristics depend in a complex manner on the Reynolds number of the incident streams, relative speed of rotation of the cylinder and distance between cylinder and screen. The presence of this screen resulted in the appearance of a repulsive force between cylinder and screen in addition to the unsteady forces acting on the cylinder at greater distances from the screen. The influence of this screen is most notable at distances of about 0.1 d or less. Rotation of the cylinder changes not only the value and nature of the forces but in some cases even their sign, particularly at critical rotational speeds. Author

N85-27060# Joint Publications Research Service, Arlington, Va.
PARAMETRIC STUDY OF AUTOOSCILLATION UPON FLOW OF SUPERSONIC JET INTO CYLINDRICAL CAVITY Abstract Only **c02**
V. N. Glaznev, A. V. Solotchin, and Sh. Suleymanov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 53 Transl. into ENGLISH from Izv. Sib. Otd. Akad. Nauk SSSR, Ser. Tekhn. Nauk Novosibirsk, USSR), ser. 3, no. 13, Oct. 1983 p 22-26 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

The oscillations which arise when a supersonic jet flows into a cylindrical cavity, the other end of which is plugged are studied with emphasis on the mechanism of development of autooscillation and the relationship between the gas dynamic structure of the jet and of the wave processes in the cavity. Experiments were performed on an acoustical jet installation, providing a stagnation pressure in the forechamber of up to about 15 x 10 to the 6th power n/sq m. The measurement system consisted of optical devices allowing photography of instantaneous flow pictures between the nozzle and the tube plus a measurement and analysis system for determination of pressures and oscillations of pressures in various cross sections of the tube. It was found that the pressure of the tube averaged over time depends only on Ma, the pressure at the end of the tube being equal to the pressure which would obtain a direct shock wave with Mach number before it equal to Ma were in front of the tube. A method is suggested for calculating the amplitude-frequency characteristics of oscillation. Author

N85-27061# Joint Publications Research Service, Arlington, Va.
STUDY OF STRESSES ON SURFACE OF FLAT BARRIER IMMERSED IN UNDER EXPANDED JET OF RAREFIED GAS Abstract Only **c02**
B. F. Panov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 54 Transl. into ENGLISH from Vest. Leningradskogo Univ. (Leningrad), ser. 19, no. 4, Oct. 1983 p 78-83 Original document previously announced as A84-15763 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

An experimental study has been made of the pressure and tangential stresses on the surface of a plane obstacle in the path of a strongly underexpanded air jet issuing from a sonic nozzle. It is shown that the relationship between the maximum value in stress distribution and the degree of rarefaction, which varies both with the gas pressure in the precombustion chamber and with the distance between the nozzle and the obstacle, is determined by the Knudsen number. The latter is derived from the gas parameters behind the shock wave and its departure from the obstacle. Empirical formulas for calculating tangential and normal stress distributions at the obstacle surface are presented. V.L. (IAA)

N85-27062# Joint Publications Research Service, Arlington, Va.
AERODYNAMIC FORCES DEVELOPING IN CHANNELS BETWEEN VASES IN TURBINE DRIVE WHEELS Abstract Only **c34**
In its USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1985 p 55 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Energetika (Minsk, USSR), no. 9, Sep. 1983 p 79-83 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

The steady flow of an ideal gas in a field of centrifugal forces is considered. A jet theory is used in which the mean absolute velocity of gas flow is determined by a quadratic equation. It is assumed that the angles between the tangential and curved paths are piecewise constant. Solution of the equation of continuity and an Euler system of equations of motion, as well as kinematic and thermodynamic equations for turbine machines, is used to develop the method for determining the aerodynamic forces arising in the channels between the vanes of the drive wheels of the turbine. Author

N85-27063# Joint Publications Research Service, Arlington, Va.
HYPERSONIC NONEQUILIBRIUM GAS FLOW PAST ZERO-ASPECT WING Abstract Only **c02**
A. I. Golubinskiy and V. N. Golubkin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 56 Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Mekh. Zhidkosti i Gaza (Moscow), no. 6, Jun. 1983 p 125-128 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

The hypersonic flow of a gas stream past a zero-aspect wing is analyzed, taking into acount the occurrence of physical and chemical nonequilibrium processes in the gas. The corresponding equations are formulated in the system of coordinates fixed to the wing. These equations are solved analytically for velocity, pressure and the density jump function by the approximate method of a thin shock layer, considering the conservation of longitudinal vorticity along a streamline characteristic of every nonequilibrium flow. A class of particular solutions is obtained, after transformation to the system of independent coordinates x,y,z and translation of the latter along the y-axis, with curvature of the wing cross section as parameter. The effect of nonequilibrium on the thickness of the shock layer is found to weaken as this curvature parameter increases. Author

N85-27064# Joint Publications Research Service, Arlington, Va.
BOUNDARY LAYER AT MOVING CYLINDER SURFACE Abstract Only **c34**
V. M. Zubarev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 56 Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Mekh. Zhidkosti i Gaza (Moscow), no. 6, Jun. 1983 p 38-42 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Th problem of symmetric steady laminar flow is solved for a

circular cylinder in a transverse stream of incompressible viscous fluid, considering the case where one part of the cylindrical surface between front and back stagnation points is movable. The corresponding two-dimensional equations of the boundary layer are formulated in dimensionless coordinates with dimensionless velocity components. After transformation to Gortler coordinates, the equations are solved for the velocity profiles and the distribution of frictional stress over the wall. The force and the work necessary for moving a cylinder through a stationary fluid are also calculated on this basis, taking into account hydrostatic pressure as well as hydraulic drag. A.R.H.

N85-27065# Joint Publications Research Service, Arlington, Va.
STABILITY OF ANISOTROPIC CYLINDRICAL SANDWICH SHELLS Abstract Only **c39**
I. Yu. Babich, A. N. Guz, and L. V. Deriglazov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 66 Transl. into ENGLISH from Prikl. Mekh. (Kiev), no. 9, Sep. 1983 p 14-20 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

A cylindrical sandwich shell is subjected to a uniform axial pressure. Cumbersome third order partial differential equations are given for such rigid orthotropic shells based on Timoshenko type hypotheses which take into account the transverse shear deformation. The equations also consider the moments due to surface forces on the shell because of the interaction of the shell with a filler. The filler is described by three-dimnsional linearized elastic stability equations; it is assumed that the shells are rigidly fastened to the filler and the contact surfaces do not coincide with the center surfaces of the shells. The stability of such shells is illustrated by graphs which plot the minimum of a dimensionless critical load parameter as a function of the geometric and mechanical parameters of the shells and filler. The critical load found from the static hypothesis is less than the corresponding load based on the kinematic theory. Author

N85-27066# Joint Publications Research Service, Arlington, Va.
STUDY OF OSCILLATIONS OF COMPOSITE CYLINDRICAL SHELLS USING A DYNAMIC STIFFNESS TECHNIQUE Abstract Only **c39**
N. S. Kondrashov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 67-68 Transl. into ENGLISH from Prikl. Mekh. (Kiev), no. 9, Sep. 1983 p 38-44 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Steady-state harmonic oscillations and deformation waves are present around the periphery of a closed shell having constant parameters along this contour. Previous analyses of such systems have employed numerical integration to solve equations derived from a differential scheme describing the dynamic stiffnesses of composite cylindrical shells. An analytical solution of the equations of motion was found, circumventing difficulties related to the transition through internal stress or motion nodes. The solution is illustrated with two sample calculations: the determination of the resonant frequencies of a free shell made of 12Kh18N10T steel with flanges; the frequency between about 190 and 650 Hz is plotted as a function of the number of deformation waves, indicating good agreement between experiment and theory; and the forced oscillations of an orthotropic shell subjected to concentrated harmonic loads are determined. The shell is tightly closed at the ends and there is a stiffening rib in the center section to which the external forces are applied. B.G.

N85-27067# Joint Publications Research Service, Arlington, Va.
STRESSED-STRAINED STATE OF TUBULAR SHELLS UNDER UNIFORMLY DISTRIBUTED PRESSURE Abstract Only **c39**
Ya. M. Grigorenko, V. I. Gulyayev, Ye. A. Gotsulyak, and K. Ashuri *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 71 Transl. into ENGLISH from Prikl. Mekh. (Kiev), v. 19, no. 8, Aug. 1983 p 11-18 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Stresses and strains in cyclic shells generated by a circle moving parallel and in channel shells with a curving planar centerline are analyzed according to the linear theory of elasticity and the moment theory of shells. The corresponding force and moment balance equations are solved by the method of finite differences for various boundary constraints determining the state of stress and strain, with the components of membrane forces and moments expressed through elongation tensor and deflection tensor components. Tangential strains are approximated by averaging them arithmetically over the internal of numerical differentiation, which ensures fast convergence of the solution. Numerical results are shown for shells under uniform internal pressure with three different combinations of deflection function, membrane force function, and membrane moment function. Three different generating circles are considered for each combination: one with constant radius, one with linearly varying radius, and one with cosinusoidally varying radius. Author

N85-27068# Joint Publications Research Service, Arlington, Va.
RESEARCH IN THE FIELD OF RIB STIFFENED SHELL STABILITY Abstract Only **c39**
I. Ya. Amiro and V. A. Zarutskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 72 Transl. into ENGLISH from Prikl. Mekh. (Kiev), no. 11, Nov. 1983 p 3-20 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

Only the literature appearing after 1967, devoting primary attention to theoretical and experimental studies of the influence of a regular pattern of the ribs on the shells will be surveyed. The following are reviewed: fundamentals of stiffened shell theory, design procedures, analysis of computed data, aspects of optimization of structural designs, procedures and results of experimental studies as well as comparisons of experimental and theoretical data. General conclusions are: with an increase in the number and stiffness of reinforcing ribs, the difference between experimental and theoretical data on critical loads is reduced, which is most likely because the stiffening of shells with ribs reduces the influence of the initial bends; even with a rather large number of ribs, losses of shell stability are accompanied by wave formation, which is evidence of the influence of the discrete patterned placement of such ribs; and it is possible to have a considerable difference between the stability losses of a shell determined experimentally by means of critical loading and the load at which it actually loses its carrying capacity. B.G.

N85-27069# Joint Publications Research Service, Arlington, Va.
STRESSED STATE OF MULTILAYER THICK-WALLED LONGITUDINALLY CORRUGATED CYLINDERS Abstract Only **c39**
Yu. N. Nemish and Yu. I. Matyash *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 73 Transl. into ENGLISH from Prikl. Mekh. (Kiev), no. 11, Nov. 1983 p 52-58 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

A multilayer hollow cylinder has longitudinal corrugations in the outer surface and the separation surfaces between the layers. This cylinder is subjected to axially symmetric forces on these surfaces; the forces are such that the desired stresses and strains are analytic functions of the radius. A general solution of the three-dimensional boundary value problem is provided for such composite cylinders with wavy surfaces. The technique is illustrated with the example of a two-layer cylinder having different corrugation geometries: (1) only the separation surface between the inner and outer layers is corrugated, with 8 wave crests and troughs around the periphery as viewed in cross-section; (2) only the exterior surface of the cylinder is corrugated, again with 8 corrugations; (3) the outer surface and separation surfaces are both corrugated with 8 corrugations, where the peaks and depressions of the corrugations coincide as viewed in cross-section; and (4) the outer and separation surfaces each have 8 corrugations with the troughs of the outer corrugations coinciding with the peaks of the inner corrugations. Author

N85-27070# Joint Publications Research Service, Arlington, Va.
TOOTH WEAR IN WORM GEARS IN VACUUM Abstract Only

c37

Ye. A. Deulin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 76 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Mashinostroyeniye (Moscow), no. 12, Dec. 1983 p 42-47 (For primary document see N85-27035 16-31)

Avail: NTIS HC A05/MF A01

The tooth wear in worm gears in vaccum is analyzed, assuming a flexible pinion with involute tooth profile and a meshing zone symmetric with respect to the major pinion deformation axis. Wear was established as adhesive and excessive in the case of dry friction and abrasive in the case of mechanically deposited solid lubricant with attendant boundary friction. This controllable abrasive wear, of both tooth base and coating materials, is calculated on the basis of linear dependence on the contact pressure. For this purpose the force and displacement profiles during engagement of meshing teeth are determined. The resulting formula for total wear reveals that the latter is proportional to the number of meshing teeth within the range of the major pinion deformation axis. On the basis of experimental data covering a wide range of alloy steels, values of the wear coefficient are recommended for use in engineering design calculations of tooth life, backlash, and necessary coating thickness according to this formula. Author

N85-27071# Joint Publications Research Service, Arlington, Va.
USSR REPORT: MACHINE TOOLS AND METALWORKING EQUIPMENT

24 May 1985 76 p Transl. into ENGLISH from various Russian articles

(JPRS-UMM-84-010) Avail: NTIS HC A05

News items, abstracts, and scientific reports on aspects of machine tools and metal working equipment including robotics; process controls and automation electronics; metal cutting and metal forming machine tools; automated lines and aggregated machining systems; industry planning; and economics are contained. For individual titles, see N85-27072 through N85-27076.

N85-27072# Joint Publications Research Service, Arlington, Va.
INSTITUTE'S CONTRIBUTION TO SOVIET WELDING TECHNOLOGY NOTED c37

G. Nikolayev *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 6-10 Transl. into ENGLISH from Pravda Ukrainy (USSR), 4 Jan. 1984 p 4 (For primary document see N85-27071 16-31)

Avail: NTIS HC A05

The history of welding in the U.S.S.R. is reviewed. The contributions of Ye.O. Paton and the economic effects of the Moscow Higher Technical Institute on the welding industry are considered. B.G.

N85-27073# Joint Publications Research Service, Arlington, Va.
STATUS, PROSPECTS OF COMPUTER-AIDED DESIGN DISCUSSED c61

B. Markov *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 18-21 Transl. into ENGLISH from Sotsialisticheskaya Industriya (USSR), 11 Mar. 1984 p 2 (For primary document see N85-27071 16-31)

Avail: NTIS HC A05

Education of engineers in the use of computer aided design systems is discussed. Psychological barriers in computer technology are examined. The need for engineers who understand computers was stressed. B.G.

N85-27074# Joint Publications Research Service, Arlington, Va.
NEW ROBOTIZED, VERTICAL BROACHING MACHINE FEATURED c37

K. Y. Levin, A. Z. Tsymkovskiy, and V. A. Yaroshevich *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 22-24 Transl. into ENGLISH from Mekh. i Avtomat. Proizvodstva (USSR), no. 3, Mar. 1984 p 7-9 (For primary document see N85-27071 16-31)

Avail: NTIS HC A05

At metal working enterprises with small series production, broaching of round and splined holes, keyway grooves in gears and flanges is done basically on types 7B55 and 7B56 horizontal broaching machine tools. Because of the small output and the wide list of the machined parts, setting up and removing parts, as well as bringing down and moving the broach away are done manually. Labor intensive readjustment of the machine tool is required when machining various parts. The Minsk Machine Tool Building Plant manufactured and introduced a model 4MP637 vertical broaching automatic machine of the processing center type for internal broaching with a broach magazine. This automatic machine tool is the first in domestic and foreign machine tool practice that provides for machining under conditions of small series and series production of a wide nomenclature of parts according to a given program without manual readjustment. The machine is intended for broaching round and splined holes, as well as keyway grooves and other internal surfaces. The use of this machine makes it possible to double and triple productivity, especially in machining heavy intermediate products, as well as to improve labor conditions and raise the production standard.Author

N85-27075# Joint Publications Research Service, Arlington, Va.
DEVELOPMENT, IMPLEMENTATION OF INDUSTRIAL LASERS REVIEWED c36

N. Rybakov *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 25-26 Transl. into ENGLISH from Sov. Rossiya (USSR), 27 Mar. 1984 p 1 (For primary document see N85-27071 16-31)

Avail: NTIS HC A05

The Experimental Scientific Research Institute of Metal-Cutting Machine Tools developed the first laser systems for industry only ten years ago. In place of the usual cutting tool these systems used a laser beam. Up till now there was no equipment available to drill with high precision holes of complex configuration in hard to machine materials like ceramics and diamonds. Lasers comparatively quickly found application in communication equipment. The beam can accomodate and transmit a tremendous amount of information. The use of laser beams has now found wide application. A prototype of a diagnostic laser system for screening bearings was developed and tested. B.G.

N85-27076# Joint Publications Research Service, Arlington, Va.
GUIDELINES FOR OPTIMIZATION OF ROBOTIZED MACHINING CELLS c37

A. Y. Baryshnikov and S. V. Ilin *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 46-50 Transl. into ENGLISH from Mekh. i Avtomat. Proizvodstva (USSR), no. 1, Jan. 1984 p 23-24 (For primary document see N85-27071 16-31)

Avail: NTIS HC A05

Robot engineering complexes (RTK) based on NC (Numeric Controlled) machine tools are becoming increasingly more widespread in machine building and metal processing. What contributes to this? First of all, the use of RTKs ensures a 10 to 20 percent increase of labor productivity over that of NC machine tool sections, as a result of reduced costs of manual labor for performance of auxiliary operations and also expansion of the service zone and number of machine tools and freeing of machine tool operators. Production output is increasing thanks to the rise in labor productivity and a 20 to 30 percent increase of the shift work coefficient of RTK oerations with simultaneous improvement of equipment loading. This creates real possibilities of raising the load coefficient to 0.85 to 0.95 percent. Then the need for special cadres to maintain the RTK's manipulators and training costs for them are reduced. As the work experience of several industrial enterprises shows, maintenance of the RTK may be entrusted to personnel involved with preparation of production on NC machine tools, their adjustment, repair and preventive maintenance by compaction of the work day. Finally, prerequisites are being developed and the possibilities of comprehensive automation of mechanical machining processes without the intervention of maintenance personnel are expanding. Author

N85-27077# Joint Publications Research Service, Arlington, Va.
EAST EUROPE REPORT: SCIENCE AND TECHNOLOGY
21 May 1985 50 p Transl. into ENGLISH from various East European articles
(JPRS-ESA-85-019) Avail: NTIS HC A03/MF A01

Technical works from eastern block countries ranging in subject matter from electronics to international cooperation in space exploration are presented. For individual titles, see N85-27078 through N85-27081.

N85-27078# Joint Publications Research Service, Arlington, Va.
PATON INSTITUTE EXPERT ON GDR-USSR WELDING RESEARCH c37
Dieter Resch *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-85-019) 21 May 1985 p 1-2 Transl. into ENGLISH from Berliner Zeitung (East Berlin), 16-17 Mar. 1985 p 3 (For primary document see N85-27077 16-31)
Avail: NTIS HC A03/MF A01

New techniques in electron beam welding and new machines are discussed. G.L.C.

N85-27079# Joint Publications Research Service, Arlington, Va.
INTERNATIONAL COOPERATION IN SPACE EXPLORATION c84
Ivana Balkova *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-85-019) 21 May 1985 p 3-5 Transl. into ENGLISH from Tribuna (Prague), 27 Mar. 1985 p 15 (For primary document see N85-27077 16-31)
Avail: NTIS HC A03/MF A01

Interkosmos is one of the best known joint agencies of the Council for Mutual Economic Aid (CEMA). This is the short title of the Council for International Collaboration in Research on and Utilization of Outer Space, founded in May 1966 under the USSR Academy of Sciences. The founding of Interkosmos as a joint agency of CEMA also broadened the bases of scientific and technological collaboration among the member countries of the Council. G.L.C.

N85-27080# Joint Publications Research Service, Arlington, Va.
USES OF LASER TECHNOLOGY DESCRIBED c36
In its East Europe Rept.: Sci. and Technol. (JPRS-ESA-85-019) 21 May 1984 p 6-7 Transl. into ENGLISH from Rude Pravo (Prague), 3 Apr. 1985 p 4 (For primary document see N85-27077 16-31)
Avail: NTIS HC A03/MF A01

The early gas lasers have been succeeded by solid phase, semiconductor, liquid, and free-electron lasers. They are used primarily in the following: medicine, information systems, engineering equipment and machine tools, construction and demolition, scientific laboratories and in reading the bar codes used to label various industrial, food and other products. G.L.C.

N85-27081# Joint Publications Research Service, Arlington, Va.
RESEARCH ON PRODUCTS OBTAINED BY POWDER METALLURGY c26
H. Colan *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-85-019) 21 May 1985 p 31-37 Transl. into ENGLISH from Met. (Bucharest), Dec. 1984 p 625-628 (For primary document see N85-27077 16-31)
Avail: NTIS HC A03/MF A01

Research in the field of powder metallurgy carried out at the Cluj-Napoca Polytechnical Institute by the Chair of Metal Technology and, since 1968, at the Research Center for Powder Metallurgy represents over 3 decades of activity. This research has furthered the development of the science and technology of powder metallurgy and has led to some remarkable industrial accomplishments. These include the development of technologies for the production of metal powders and of high performance sintered products which have replaced imports, have made good use of raw materials and energy. It is notable that the research for the development of metal powders and sintered products has included the technological development up to the industrial design of specific equipment and of production lines; this has led to industrialization of powder metallurgy in Romania and to the construction of several plants. The technologies and installations are mostly original, based on local design; they make use of a large number of inventions and help reduce import of licensed technologies. G.L.C.

N85-26642# Naval Air Systems Command, Washington, D. C.
DESIGN ADEQUACY: AN EFFECTIVENESS FACTOR
A. R. Habayeb *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 16 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-27108*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REPAIR OF THE DSS-14 PEDESTAL CONCRETE
D. McClure *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 136-148 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 13B

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N85-27082 Polish Academy of Sciences, Warsaw. Acoustic Phonetics Lab.
AUTOMATION OF THE PROCESS OF SPEECH SIGNAL SEGMENTATION IN AN ANALOGIC-NUMERIC SYSTEM [AUTOMATYZACJA PROCESU SEGMENTACJI SYNGNALU MOWY W UKLADZIE ANLOGOWO-CYFROWYM]
Piotr Domagala 1984 23 p refs In POLISH
(Rept-5/1984; ISSN-0208-5658) Avail: Issuing Activity

Eighteen Polish words uttered by 12 voices (7 male and 5 female) were taperecorded and analyzed by computer. Numeric analysis of the dynamic spectrum was implemented using an algorithm composed of simple logical sentences on the MERA 303 minicomputer. Compared with the visual segmentation achieved in the spectrographic computer images, correctness of segmentation reached a level of about 94 percent. No differences were found in quality of segmentation between male and female utterances. Author

N85-27083 Polish Academy of Sciences, Warsaw. Dept. of Electromagnetic Wave Theory.
FIELD NEAR THE FRONT OF A SIGNAL IN A WAVEGUIDE ACCOMPLISHED WITH DISPERSIVE PLASMA [POLE W POBLIZU CZOLA SYGNALU W FALOWODZIE WYPELNIONYM PLAZMA DYSPERSYJNA]
Anna Brahmer-Kacprzynska 1984 13 p refs In POLISH
(Rept-11/1984; ISSN-0208-5658) Avail: Issuing Activity

The propagation of an electromagnetic signal in a two-walled plastic waveguide achieved with isotropic, dispersive, cold electronic plasma is discussed. Asymptotic methods are proposed for the solution of dispersive hyperbolic equations. Parallel plane waveguide Green functions are considered. The results provide: (1) Green's function for a plastic waveguide achieved with a dispersion medium; (2) Green's function for a plastic waveguide achieved with homogeneous electronic plasma; and (3) a transitory function describing the field near the front of a signal in a waveguide achieved with heterogeneous electronic plasma. Transl. by B.G.

N85-27084 Polish Academy of Sciences, Warsaw. Dept. of Continuous Medium Theory.
CHARACTERISTIC FUNCTIONALS OF STOCHASTIC WAVE PROCESSES [FUNKCZJONALY CHARAKTERYSTYCZNE STOCHASTYCZNYCH PROCESOW FALOWYCH]
Zbigniew Kotulski 1984 175 p refs In POLISH
(Rept-14/1984; ISSN-0208-5658) Avail: Issuing Activity

Equations describing the characteristic functions of stochastic wave processes are presented, and the construction of these mathematical functionals is discussed. An equation is derived for the characteristic functional of the solution of a stochastic equation in a Hilbert space. Use of the equation to analyze random wave fields is considered. Construction of characteristic functionals of random physical processes also is examined. The obtained mathematical results are verified using the example of an equation describing a wave in a cord. The problem of the propagation of a one-dimensional thermoelastic wave in a medium with temporospatial fluctuations is resolved. The problem of diffusion in a turbulent liquid also is discussed. Transl. by B.G.

N85-27085 Illinois Univ., Urbana-Champaign.
SCATTERING CENTER ANALYSIS FOR RADAR CROSS SECTION MODIFICATION Ph.D. Thesis
Michael Paul Hurst 1984 114 p
Avail: University Microfilms Order No. DA8502187

At high frequencies, electromagnetic scattering can be described in terms of scattering centers. An understanding of the nature of these scattering centers as a function of scatter geometry and composition is important for radar cross section modification. In this thesis the effects of corner rounding and resistive loading on the scattering center description are studied by first obtaining numerically the solutions to certain scattering problems and then applying an inverse scattering algorithm based on Prony's method. Scattering problems involving bodies too large for conventional moment method matrix inversion techniques are solved by an iterative approach based on the conjugate gradient method and employing the FFT for computational efficiency. In this way flat plates and finite cylindrical shells modeled with several thousand patches have been treated. Numerical results are presented which show that appropriate corner rounding and resistive loading can dramatically reduce the radar cross section of a scatterer. Dissert. Abstr.

N85-27086 Department of the Navy, Washington, D. C.
INTERFERENCE SUPPRESSOR FOR RADAR MTI Patent
B. L. Lewis and F. F. Kretschmer, inventors (to Navy) Issued 18 Dec. 1984 5 p Supersedes AD-D008834
(AD-D011606; US-Patent-4,489,320; US-Patent-Appl-SN-290757; US-Patent-Class-343-7.7) Avail: US Patent and Trademark Office CSCL 17/9

An impulse interference suppression circuit for use in combination with an N-pulse Moving Target Indicator system comprising a gate connected to block the output signal from the MTI system when energized, and a circuit for taking the magnitudes of successive echo return signals, subtracting the magnitudes of consecutive echo signals to remove clutter, comparing the consecutive difference signals from such subtractions against each other, and generating and applying a blocking signal to the gate if the difference between the subtraction difference signals is above a given threshold level. (Author). GRA

N85-27087 Department of the Navy, Washington, D. C.
OPTICAL NON-LINE-OF-SIGHT COVERT, SECURE HIGH DATA COMMUNICATION SYSTEM Patent
M. Geller, T. E. Keenan, D. E. Altman, and R. H. Patterson, inventors (to Navy) Issued 8 Jan. 1985 7 p
(AD-D011607; US-Patent-4,493,114; US-Patent-Appl-SN-490695; US-Patent-Class-455-617) Avail: US Patent and Trademark Office CSCL 17/2

An omnidirectional non-line-of-sight communication capability is assured by transmission and reception in the solar blind ultraviolet spectrum. An omnidirectional ultraviolet source generates a UV carrier in the tens of watts power range. This is modulated and received by having a sensitivity to respond to scattered UV modulated energy. Pulse modulating the ultraviolet spectrum signal and providing appropriate logic circuitry associated with the wide field-of-view receiver reduces the values of bit error rate. GRA

N85-27088 Technische Univ., Munich (West Germany). Inst. fuer Mathematische.
OPTIMAL FREQUENCIES FOR BROADCAST TRANSMITTERS IN THE UHF DOMAIN: REPORT [OPTIMALE FREQUENZEN FUER RUNDFUNKSENDER IM UKW-BEREICH]
Ralf Kleinsteuber Sep. 1984 74 p refs In GERMAN
(TUM-M8404) Copyright. Avail: Issuing Activity

A mathematical procedure for redistribution of UHF frequencies was developed. A general solution procedure is presented which theoretically allows a solution of all the problems, but which can only be used in a limited range in practical calculations. The efficiency and applicability of the algorithms are investigated. Computer programs are enclosed. Author (ESA)

N85-27089*# Ohio State Univ., Columbus. ElectroScience Lab.
METEOROLOGICAL FACTORS IN EARTH-SATELLITE PROPAGATION Final Report, 12 Mar. 1981 - 30 Jun. 1983
Curt A. Levis, Edward K. Damon, Kuan-ting Lin, and Albert E. Weller, III Mar. 1984 71 p refs Prepared for JPL
(Contract NAS7-100)
(NASA-CR-175764; JPL-9950-979; NAS 1.26:175764; ESL-713656-4) Avail: NTIS HC A04/MF A01 CSCL 20N

A 5-meter paraboloidal antenna operated at 28 GHz showed gain changes of 2 dB due to rain. While precise estimation of the corresponding angle of arrival changes is difficult, they appear to have been on the order of 0.02 degrees. The attenuation at 28.6 GHz inferred from radiometry agreed well with that measured simultaneously over a satellite/Earth link at the same frequency. The radiometers so calibrated have been used to add to the available site diversity data base using a 9 km baseline. An improved empirical model of site diversity gain was obtained by applying regression techniques to available published data. A brief review of the literature has led to suggestions for two experimental programs, one dealing with multifrequency radiometry and the other with the effects of the stochastic properties of precipitation on wideband data transmission. Author

N85-27090*# Operations Research, Inc., Rockville, Md.
CONSULTATIVE COMMITTEE FOR SPACE DATA SYSTEMS. PANEL 1: SUPPORT Final Report
29 Mar. 1985 51 p refs Prepared for JPL
(Contract JPL-956753)
(NASA-CR-175786; JPL-9950-1087; NAS 1.26:175786) Avail: NTIS HC A04/MF A01 CSCL 17B

Space data systems are discussed. Recommendations concerning Earth station equipment and a procedure to determine the transmitted frequency sweep range on the Earth-to-space link for category B missions, are among the topics discussed. R.J.F.

N85-27091*# R and D Associates, Marina Del Rey, Calif.
AUTOMATED CPX SUPPORT SYSTEM PRELIMINARY DESIGN PHASE Final Report
T. A. Bordeaux, E. T. Carson, C. D. Hepburn, and F. M. Shinnick Mar. 1984 241 p refs Prepared for JPL
(Contract JPL-956622)
(NASA-CR-175784; NAS 1.26:175784; RDA-TR-185500-005) Avail: NTIS HC A11/MF A01 CSCL 17B

The development of the Distributed Command and Control System (DCCS) is discussed. The development of an automated C2 system stimulated the development of an automated command post exercise (CPX) support system to provide a more realistic stimulus to DCCS than could be achieved with the existing manual system. An automated CPX system to support corps-level exercise was designed. The effort comprised four tasks: (1) collecting and documenting user requirements; (2) developing a preliminary system design; (3) defining a program plan; and (4) evaluating the suitability of the TRASANA FOURCE computer model. E.A.K.

N85-27092*# Western Union Telegraph Co., McLean, Va. Government Systems Div.
SATELLITE PROVIDED CUSTOMER PROMISES SERVICES, A FORECAST OF POTENTIAL DOMESTIC DEMAND THROUGH THE YEAR 2000. VOLUME 4: SENSITIVITY ANALYSIS
D. Kratochvil, J. Bowyer, C. Bhushan, K. Steinnagel, D. Kaushal,

and G. Al-Kinani Mar. 1984 261 p 4 Vol.
(Contract NAS3-23255)
(NASA-CR-174662; NAS 1.26:174662) Avail: NTIS HC A12/MF A01 CSCL 17B

The overall purpose was to forecast the potential United States domestic telecommunications demand for satellite provided customer promises voice, data and video services through the year 2000, so that this information on service demand would be available to aid in NASA program planning. To accomplish this overall purpose the following objectives were achieved: (1) development of a forecast of the total domestic telecommunications demand; (2) identification of that portion of the telecommunications demand suitable for transmission by satellite systems; (3) identification of that portion of the satellite market addressable by consumer promises service (CPS) systems; (4) identification of that portion of the satellite market addressable by Ka-band CPS system; and (5) postulation of a Ka-band CPS network on a nationwide and local level. The approach employed included the use of a variety of forecasting models, a parametric cost model, a market distribution model and a network optimization model. Forecasts were developed for: 1980, 1990, and 2000; voice, data and video services; terrestrial and satellite delivery modes; and C, Ku and Ka-bands. R.J.F.

N85-27093# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RADAR RETURN FROM VEGETATION COVERED TERRAINS
Roberto Pereira daCunha Mar. 1985 5 p refs Proposed for presentation at the Intern. Symp. on Microwave Technol. in Ind. Develop., Campinas, Brazil, 22-25 Jul. 1985
(INPE-3470-PRE/713) Avail: NTIS HC A02/MF A01

Radar return from vegetation covered terrains is due to three components: (1) the scattering resulting from the top surface of the vegetation canopy (surface scattering); (2) the scattering which occurs within the vegetation layer (volume scattering), and (3) the scattering which takes place at the surface below the vegetation canopy (ground scattering). Through the studies of selected areas a case is presented where most of the radar return observed in radar imageries results from the scattering at the surface below the vegetation layer (ground scattering). Author

N85-27094*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Jan. - Mar. 1985
E. C. Posner, ed. 15 May 1985 167 p refs Sponsored by NASA
(NASA-CR-175842; JPL-TDA-PR-42-81; NAS 1.26:175842) Avail: NTIS HC A08/MF A01 CSCL 17B

Reports on developments in programs managed by JPL's Office of Telecommunications and Data Acquisition are presented. Emphasis is placed on activities of the Deep Space Network and its associated ground facilities. For individual titles, see N85-27095 through N85-27109.

N85-27095*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RELATING THE PLANETARY EPHEMERIDES AND THE RADIO REFERENCE FRAME
A. E. Niell, X. X. Newhall, R. A. Preston, G. L. Berge (California Inst. of Tech.), D. O. Muhleman (California Inst. of Tech.), D. J. Rudy (California Inst. of Tech.), J. K. Campbell, P. B. Esposito, and E. M. Standish *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 1-8 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 17B

The positions of Venus, Mars, and Jupiter were obtained in the VLBI radio reference frame by measuring the position of a satellite (natural or artificial) of each planet relative to an extragalactic source in the radio catalogue. From the results for Mars and Venus it is concluded that the offset in right ascension of the radio frame from the dynamical equinox defined in DE200 is 0.00 sec +/- 0.04 sec. The observations for Jupiter imply a correction to its position from DE200 of -0.18 sec +/- 0.04 sec in right ascension and -0.06 +/- 0.05 sec in declination on 1983 April 29. The right ascension of Jupiter relative to the inner planets has been measured independently using Doppler tracking data near Jupiter encounter from Pioneers 10 and 11 and from Voyagers 1 and 2 by tying the tracking station positions, through previous spacecraft missions, to the DE200 ephemerides of the inner planets. This technique yielded a correction to Jupiter's right ascension of -0.22 +/- 0.05 sec, in good agreement with the results from the direct radio measurements. M.G.

N85-27096*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PHOTON DETECTION WITH COOLED AVALANCHE PHOTODIODES: THEORY AND PRELIMINARY EXPERIMENTAL RESULTS **c33**
D. L. Robinson and D. A. Hays *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 9-17 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09A

Avalanche photodiodes (APDs) can be operated in a geiger-tube mode so that they can respond to single electron events and thus be used as photon counting detectors. Operational characteristics and theory of APDs while used in this mode are analyzed and assessed. Preliminary experimental investigation of several commercially available APDs has commenced, and initial results for dark count statistics are presented. Author

N85-27097*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TECHNIQUES FOR COMPUTING THE DFT USING THE RESIDUE FERMAT NUMBER SYSTEMS AND VLSI **c33**
T. K. Truong, J. J. Chang, I. S. Hsu (Univ. of Southern California), D. Y. Pei (Univ. of Southern California), and I. S. Reed (Univ. of Southern California) *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 18-30 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

The integer complex multiplier and adder over the direct sum of two copies of a finite field is specialized to the direct sum of the rings of integers modulo Fermat numbers. Such multiplications and additions can be used in the implementation of a discrete Fourier transform (DFT) of a sequence of complex numbers. The advantage of the present approach is that the number of multiplications needed for the DFT can be reduced substantially over the previous approach. The architectural designs using this approach are regular, simple, expandable and, therefore, naturally suitable for VLSI implementation. M.G.

N85-27098*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
BIT ERROR RATE OF COHERENT M-ARY PSK
P. J. Lee *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 31-37 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 17B

The bit error rate (BER) for the coherent detection of M-ary PSK signals with Gray code bit mapping is considered. A closed-form expression for the exact BER of M-ary PSK is presented. Tight upper and lower bounds on BER are also obtained for M-ary PSK with larger M. Author

N85-27099*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SYNCHRONIZING HEAVILY ENCODED DATA IN BAD WEATHER
L. Swanson *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 38-39 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 17B

Deep space missions choose a data rate to ensure reliable communication under most conditions. Certain critical data can be more heavily encoded, to be decoded under particularly bad

atmospheric conditions. It is shown that, in such a system, finding and synchronizing critical data will not be a problem. Author

N85-27100*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A SOFTWARE SIMULATION STUDY OF A SEQUENTIAL DECODER USING THE FANO ALGORITHM
F. Pollara *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 40-41 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 17B

A set of subroutines was developed to simulate the performance of a sequential decoder based on the Fano algorithm. This simulation can be used to verify the coding performance of the International Cometary Explorer (ICE) communication link. The probability of frame deletion can be measured as a function of the number of computations allowed per frame and of E(b)/N(o). Both hard and soft quantized inputs are considered. M.G.

N85-27101*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SYMBOL STREAM COMBINING IN A CONVOLUTIONALLY CODED SYSTEM
R. J. McEliece (California Inst. of Tech., Pasadena), F. Pollara, and L. Swanson *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 47-50 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 17B

Symbol stream combining has been proposed as a method for arraying signals received at different antennas. If convolutional coding and Viterbi decoding are used, it is shown that a Viterbi decoder based on the proposed weighted sum of symbol streams yields maximum likelihood decisions. Author

N85-27102*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN INTEGRATED UNIX-BASED CAD SYSTEM FOR THE DESIGN AND TESTING OF CUSTOM VLSI CHIPS c33
L. J. Deutsch *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 51-62 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

A computer aided design (CAD) system that is being used at the Jet Propulsion Laboratory for the design of custom and semicustom very large scale integrated (VLSI) chips is described. The system consists of a Digital Equipment Corporation VAX computer with the UNIX operating system and a collection of software tools for the layout, simulation, and verification of microcircuits. Most of these tools were written by the academic community and are, therefore, available to JPL at little or no cost. Some small pieces of software have been written in-house in order to make all the tools interact with each other with a minimal amount of effort on the part of the designer. Author

N85-27103*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
HIGH-SPEED DIGITAL BASEBAND MIXER c33
F. P. Chan, M. P. Quirk, and R. F. Jurgens *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 63-80 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09A

The feasibility of designing a digital, complex, baseband mixer with a 50 MHz sampling rate is explored. The baseband filter must provide passbands with linear phase response to minimize intersymbol interference. The effects of signal quantization, filter coefficient quantization, dynamic range, filter response characteristics, and the performance of the mixer when used for cross correlation and autocorrelation pulse detection techniques are discussed. This filter was designed for use in the high speed data acquisition system (HSDAS), an advanced experimental system in the Deep Space Network. M.G.

N85-27104*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DIGITAL FILTERS FOR DIGITAL PHASE-LOCKED LOOPS c33
M. Simon and A. Mileant *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 81-93 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

An s/z hybrid model for a general phase locked loop is proposed. The impact of the loop filter on the stability, gain margin, noise equivalent bandwidth, steady state error and time response is investigated. A specific digital filter is selected which maximizes the overall gain margin of the loop. This filter can have any desired number of integrators. Three integrators are sufficient in order to track a phase jerk with zero steady state error at loop update instants. This filter has one zero near $z = 1.0$ for each integrator. The total number of poles of the filter is equal to the number of integrators plus two. M.G.

N85-27105*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAINTENANCE OF TIME AND FREQUENCY IN THE DSN USING THE GLOBAL POSITIONING SYSTEM c04
P. A. Clements, A. Kirk, and S. E. Borutzki *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 94-108 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 17G

The Deep Space Network must maintain time and frequency within specified limits in order to accurately track the spacecraft engaged in deep space exploration. The DSN has three tracking complexes, located approximately equidistantly around the Earth. Various methods are used to coordinate the clocks among the three complexes. These methods include Loran-C, TV Line 10, very long baseline interferometry (VLBI), and the Global Positioning System (GPS). The GPS is becoming increasingly important because of the accuracy, precision, and rapid availability of the data; GPS receivers have been installed at each of the DSN complexes and are used to obtain daily time offsets between the master clock at each site and UTC(USNO/NBS). Calculations are made to obtain frequency offsets and Allan variances. These data are analyzed and used to monitor the performance of the hydrogen masers that provide the reference frequencies for the DSN frequency and timing system (DFT). A brief history of the GPS timing receivers in the DSN, a description of the data and information flow, data on the performance of the DSN master clocks and GPS measurement system, and a description of hydrogen maser frequency steering using these data are presented. Author

N85-27106*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NETWORK INFORMATION MANAGEMENT SUBSYSTEM c81
C. C. Chatburn *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 109-115 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 05A

The Deep Space Network is implementing a distributed data base management system in which the data are shared among several applications and the host machines are not totally dedicated to a particular application. Since the data and resources are to be shared, the equipment must be operated carefully so that the resources are shared equitably. The current status of the project is discussed and policies, roles, and guidelines are recommended for the organizations involved in the project. Author

N85-27107*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A DESCRIPTION OF THE 64-METER ANTENNA ELEVATION DRIVE GEARS AND THEIR STRANGE WEAR c37
H. McGinness *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 116-135 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 13I

The Deep Space Station (DSS) 64-m antenna elevation axis drive is executed by torquing two bull gears, concentric to the elevation axis, with the output pinions of four gear boxes. These

gear boxes have functioned well during the 18 and 11 years, respectively, that the DSS 14, and the DSS 43 and DSS 63 antennas have been in service. A strange wear pattern gradually developed on the bull gears and driving pinions of all three antennas. These patterns were well developed after 8 years and apparently are intensifying in all instances. The elevation drive gears are described and their wear is compared to the wear of other antenna drive gears. The comparison is perplexing and satisfying explanations have not yet been made. M.G.

N85-27108*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

REPAIR OF THE DSS-14 PEDESTAL CONCRETE c31

D. McClure *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 136-148 refs (For primary document see N85-27094 16-32)

Avail: NTIS HC A08/MF A01 CSCL 13B

About three years after the Goldstone Deep Space Station antenna was dedicated, grout under the hydrostatic bearing runner was found to be interacting with the runner, causing rust to form between the runner and the sole plates upon which it rests. The rust formed unevenly and the runner could not be kept flat so in 1969 the grout was removed and replaced with a Portland cement and sand dry pack grout that was less likely to produce rust. In the years that followed, oil leaking from the runner assembly caused progressive deterioration of the drypack grout. In 1982 over one thousand hours of spacecraft tracking time were lost due to this deterioration. A plan was developed to rehabilitate the bearing. The plan called for raising the rotating structure free from the concrete pedestal and placing it on three pairs of external support columns. With the weight of the structure transferred to the columns, the pads and runner could be removed and the repair started. The very successful repair included the replacement of a significant portion of the antenna pedestal. Author

N85-27109*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DETERMINING AVAILABILITY CHARACTERISTICS OF DSN DATA SYSTEMS USING DISCREPANCY REPORT DATA c66

A. M. Ruskin and C. T. Quach *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 149-161 (For primary document see N85-27094 16-32)

Avail: NTIS HC A08/MF A01 CSCL 12B

A reasonably economical way was developed to determine availability characteristics of Deep Space Network (DSN) data systems, subsystems, and assemblies using the DSN discrepancy report (DR) data base and DSN operating schedule and history data bases. Operating mean time between failures (OMTBF), operating mean time to restore service (OMTTRS), and operating functional availability (OFA) can be computed by year, by system, by subsystem, by assembly, and by station. The effort required to produce the desired reports is described, specific data on the telemetry, command, and tracking systems are presented, and major contributors to system outages are identified. Future improvements in preparing and analyzing DR data are also outlined to enhance their use in correcting conditions that lead to outages. M.G.

N85-27110# Aerospace Corp., El Segundo, Calif. Electronics Research Lab.

EHF ATTENUATION DERIVED FROM EMISSION TEMPERATURES IN LIGHT RAIN Technical Report

F. I. Shimabukuro, M. T. Tavis, and D. S. Chang 31 Dec. 1984 31 p

(Contract F04701-83-C-0084)

(AD-A151166; TR-0084A(5925-05)-1; SD-TR-84-58) Avail: NTIS HC A03/MF A01 CSCL 04/2

Atmospheric emission measurements have routinely been used to determine the total attenuation on an Earth-space path at the centimeter and millimeter wavelengths. In the presence of rain, scattering effects have to be taken into account at frequencies > 20 GHz when one interprets emission data to derive the total attenuation. If one uses the radiometric relation to derive the attenuation, assuming an absorptive medium, one finds that the predicted attenuation underestimates the true attenuation. The reason for this is that the rain scatters more emission energy out of the direct ray path than into it. Calculations of the atmospheric emission temperature and attenuation in light-to-moderate rain at different frequencies and rain rates are performed, taking into account molecular absorption, and varying cloud cover and ground temperature. The results show that for typically encountered meteorological conditions, the radiometric formula can be used to derive the total attenuation (< 10 dB) from emission measurements with accuracies of the order less than 1 dB, provided that the empirical constant in the radiometric formula, dependent on the ambient temperature, is a function of frequency and ground temperature. GRA

N85-27111# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

THE DEVELOPMENT AND IMPLEMENTATION OF AN OPTICAL COMMUNICATIONS LABORATORY M.S. Thesis

W. K. Aiu Dec. 1984 74 p

(AD-A151682; AD-E751179; AFIT/GE/EE/84D-12) Avail: NTIS HC A04/MF A01 CSCL 17/2

This report is an accumulation of seven optical laboratory experiments developed for the Optical Communications Program at the Air Force Institute of Technology. The projects include measurement of pertinent parameters of Fourier Optics (diffraction patterns and lenses) and Acousto-Optics (Bragg angle and beam deflection using an acousto-optic modulator), image construction and spatial filtering, laser communications with an acousto-optic modulator and a scheme for implementing a time integrating correlator using two full size acousto-optic modulators. Each experiment is self-contained with subsections on project assignments, objectives, theory-background, special problems, and experimental results. The results of this report recommend that the Optical Communications Program at AFIT further develop their experimental laboratory and acquire some state-of-the-art acousto-optic modulators for students to pursue research and future studies. Author (GRA)

N85-27112# Pennsylvania State Univ., University Park. Wave Propagation Lab.

MULTIPLE SCATTERING OF ELECTROMAGNETIC WAVES IN DISCRETE RANDOM MEDIA Final Report, 1 Jul. 1983 - 31 Oct. 1984

V. K. Varadan and V. V. Varadan 31 Dec. 1984 267 p

(Contract DAAG29-83-K-0097)

(AD-A151766; ARO-20846.16-GS) Avail: NTIS HC A12/MF A01 CSCL 20/14

The study of attenuation, dispersion and the intensity of electromagnetic waves in a discrete random medium was pursued. The emphasis was on anisotropic effects induced by microstructure (nonspherical aligned scatterers); interpretation of the Quasi-Crystalline Approximation (QCA) as a partial summation of the multiple scattering series; a study of various methods of computing the pair- correlation function including Monte-Carlo techniques; a propagator model for wave propagation in random media based on Feyman diagrams and preliminary computation of the coherent and incoherent intensities which have also been compared with the experiments of Killey and Meeten; a spatial stochastic system model for wave propagation in random media and method of discontinuous stochastic field. A development that will be useful to the research on this project as well as the present one is the development of a QR-algorithm to obtained the T-matrix of scatterers with a high aspect ratio and deeply corrugated surfaces. GRA

N85-27113# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

DISTRIBUTED CONTROL OF CIRCUITS IN MULTIUSER COMMUNICATION NETWORKS WITH CIRCUIT PRECEDENCE AND PATH SUITABILITY CRITERIA USING FAILSAFE ROUTING CONCEPTS M.S. Thesis

M. C. Ferrante Dec. 1984 130 p

(AD-A151825; AFIT/GE/ENG/84D-29) Avail: NTIS HC A07/MF A01 CSCL 17/2

A distributed aperiodic failsafe algorithm is developed for application in a dedicated circuit allocation and restoral environment using circuit precedence features. The algorithm uses update control messages, initiated by changes in network topology or in user-defined truck weighting parameter, to determine shortest path routes. The number for the connected are compared with an equiprobable multinomial distribution and found to deviate only slightly from the hypothesized standard. Performance is slightly worse for a 16-node network than for an 8-node network. Single truck failures and subsequent circuit restoral indicate that high priority circuits will find new end-to-end paths but that low priority circuits stand little chance of restoral. Finally, attempts to include path suitability constraints verify that problem prone routes may be avoided if slightly larger average hop counts per circuit and fewer total circuit connections are tolerable. GRA

N85-27114# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
SURVEY OF NARROW BAND VOCODER TECHNOLOGY M.S. Thesis
W. B. McMinn, Jr. Dec. 1984 177 p
(AD-A151919; AFIT/CI/NR-85-24T) Avail: NTIS HC A09/MF A01 CSCL 17/2

The USAF has a need to identify a vocoder to insert into a Low Probability of Intercept (LPI) communications system. It should be small, lightweight, low power, capable of operating in many types of aircraft, and capable of processing intelligible, natural sounding speech at 400 to 600 bits/seconds. Two separate units are needed: one to be used in a near-term brassboard test system and one to be used in a far-term production system. Weighted characteristic values are combined through a mapping and summing procedure to form a Figure of Merit for each system. Using these characteristic values, primary vocoder candidates have been identified and are discussed in this paper. Author (GRA)

N85-27115# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN EMPIRICAL SELF-PROTECTION CHAFF MODEL M.S. Thesis
R. J. Rohrs Dec. 1984 73 p
(AD-A151928) Avail: NTIS HC A04/MF A01 CSCL 17/6

The purpose of this study was to develop a computer model to calculate the probability of attaining breaklock in an aircraft-chaff-tracking radar encounter. Although some of the assumptions made may seem to oversimplify the model, these were necessary to create the simple, quick running simulation that was desired. This thesis produced a simulation capable of charting the effectiveness of chaff used in the self-protective mode. Simulation results can be used to determine which type/design of chaff/chaff canister will produce a greater probability of breaklock for a given scenario. The radar included in this simulation is a Scan with Compensation tracking radar. Variable parameters include pulse width, beamwidth, pulse repetition frequency, and operation frequency. An ideal MTI filter is incorporated into the model to negate the effect of MTI blind speeds. Results of several simulation runs illustrate the effects of varying chaff radar cross section and aircraft velocity on the probability of attaining breaklock. Although aircraft maneuvers are not included in the simulation, conclusions as to how the probability of breaklock is affected can be made by varying the velocity vector. GRA

N85-27116# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
RADIATION AND SCATTERING OF SPIRAL ANTENNAS M.S. Thesis
J. P. Skinner Dec. 1984 107 p
(AD-A151929; AFIT/GE/ENG/84D-60) Avail: NTIS HC A06/MF A01 CSCL 17/3

This study uses the method of moments with the Electromagnetic Surface Patch Code to analyze the radiation patterns and currents developed on a planar logarithmic spiral antenna. The study also outlines a method to analyze the radar cross sections of the antenna. Three computer modelling concepts are explored. The first and most simple is the thin wire model, which is a set of straight thin wire segments which approximates the shape of the antenna. The second concept explored is that of wire grid modelling. The purpose of this model is to check the transverse components of current along the strips of the spiral's arms. The last model is the patch model, which is introduced to best model the structural scattering component of radar cross section. Unfortunately, this model proved to be infeasible unless a very fast computer system is used. Results are given for the sum and difference modes of radiation. These results show that the thin wire model is adequate for radiation analysis, but the tips of the arms must be modelled with an impedance to absorb the outward travelling energy in the current. Without this loading, the arms will develop a standing wave pattern for the current distribution, which is inconsistent with experiments. GRA

N85-27117# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
IMPLEMENTATION OF A REAL-TIME, INTERACTIVE, CONTINUOUS SPEECH RECOGNITION SYSTEM M.S. Thesis
K. R. Dixon Dec. 1984 136 p
(AD-A151936; AFIT/GE/ENG/84D-26) Avail: NTIS HC A07/MF A01 CSCL 09/2

This thesis describes a speech recognition system designed and implemented to recognize continuous speech in a real time environment (after training). Several techniques were incorporated to characterize phonemes as vectors in space. Through the use of distance rules it was possible to characterize words by a phoneme representation, which could subsequently be used in word recognition. This approach to speech recognition offers several possibilities for future investigations such as varying the Minkowski distances and applying clustering techniques. The algorithm developed was modularized on a hierarchical basis and was user friendly. GRA

N85-27118# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ZIV-ZAKAI BOUND APPLIED TO AN AMPLITUDE-COMPARISON MONOPULSE RADAR M.S. Thesis
T. E. Smith Dec. 1984 172 p
(AD-A151937; AFIT/GE/ENG/84D-62) Avail: NTIS HC A08/MF A01 CSCL 17/9

This investigation estimates the target off-boresight of a monopulse radar, generates an error signal, and excites a servo system to reposition the boresight on target, thus providing target tracking. Cramer-Rao and Ziv-Zakai (ZZ) bounds are derived to indicate system performance under varying signal-to-noise ratio (SNR) conditions. Actual tracking error is approximated from a computer simulation and compared to the CR and ZZ bounds for varying SNR levels, for tracking in slow and rapid target fluctuation environments, and for tracking in the presence of specular and diffuse multipath. A two-dimensional tracking model and associated performance bound are also presented. At high SNR levels, the CR bound results lower bounded the mean-square tracking error (MSE), but for low SNR conditions the CR bound results exceeded the MSE. The ZZ bound results indicate a tight lower bounds for the MSE at low SNR levels and in both the multipath and target fluctuation environments. Slow target fluctuations and diffuse multipath results indicate that target tracking capability is not seriously degraded in either of these two surroundings. GRA

N85-27119# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EVALUATING SYNTACTIC CONSTRAINTS TO SPEECH RECOGNITION IN A FIGHTER AIRCRAFT ENVIRONMENT M.S. Thesis
D. B. Stockton Dec. 1984 292 p
(AD-A152117; AD-E401303; AFIT/GE/ENG/84D-64) Avail: NTIS HC A13/MF A01 CSCL 05/7

A flexible software system has been developed to test the effects of adding syntactic knowledge to an isolated speech

phoneme-based word recognizer. Words from seventy-word fighter plane vocabulary, spoken by five pilots at four different levels of background noise, are automatically concatenated into commands randomly chosen from a set of over seven trillion. These commands are then recognized using an existing word recognizer together with grammars of differing specificity. Results are compiled automatically. The system is flexible in that system components such as the command generator, parser, grammar, or word recognizer can be interchanged with very little software modification. Preliminary testing demonstrated that, although the modified word recognizer exhibited very poor performance, the use of more specific grammars enhanced recognition accuracy, sometimes drastically. Author (GRA)

N85-27120# Raytheon Co., Goleta, Calif. Electromagnetic Systems Div.
DIGITAL RF DELAY LINE FOR ECM (ELECTRONIC COUNTERMEASURE) LOOK-THROUGH
18 Dec. 1984 49 p
(Contract N00039-81-C-0361)
(AD-A152120; AD-E401303) Avail: NTIS HC A03/MF A01 CSCL 17/4

Jamming signals, when reflected from structure to receiver, produce unwanted reflected signal interference in a countermeasure system. Elimination of these reflections would increase look-through capability. It is the goal of this project to demonstrate Digital RF Memory (DRFM) techniques which would null these unwanted reflected signals. Controlled injection of a transmitter signal into a receiver is a method of nulling this interference. Successfull nulling requires control of delay, phase, and gain of the feedback signal. The feasibility of using sampling electronics for storage and delay control was demonstrated in this project. The DRFM was used to simulate the electronic countermeasure (ECM) transmitter. Delays in the injection path were generated with high rate shift registers. The phase and gain of the injection paths were set with linear elements. The results from the experiment include bandwidth and quality of available nulls, as well as recommendations for the selection of nulling strategy. GRA

N85-27121# Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF DATA DICTIONARIES AND THEIR ROLE IN INFORMATION RESOURCE MANAGEMENT M.S. Thesis
S. L. Landin and R. L. Owens Sep. 1984 109 p
(AD-A152134) Avail: NTIS HC A06/MF A01 CSCL 05/2

The goal of efficient management of an organization's information resource can be accomplished through the implementation and use of a data dictionary. This thesis defines the structure and functions of a data dictionary and analyzes the attempt of the National Bureau of Standards to promulgate a standard software specification for use in the evaluation and selection of data dictionaries in the federal government. Criteria for the ideal data dictionary are developed based on the role a dictionary can play in information resource management and are then used to evaluate four commercial data dictionary packages. Finally, some ideas concerning possible applications for data dictionary technology are presented. GRA

N85-27122# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A SHORT RANGE, HIGH ACCURACY RADAR RANGING SYSTEM M.S. Thesis
K. E. Thomsen Dec. 1984 78 p
(AD-A152195; AFIT/GE/ENG/84D-66) Avail: NTIS HC A05/MF A01 CSCL 17/9

This paper described the design and test of a low power, highly accurate FM-CW radar ranging system. The objective of the design was to provide an inexpensive aircraft-to-aircraft ranging system with + or - 1 foot accuracy at ranges up to 400 feet. Particular detail is given to describe the design and test frequency tracking circuit. Quartz crystals were used to make the narrow bandpass filters necessary for good frequency resolution. The design of the rest of the system was kept simple by using standard electronic test equipment. The system was tested for its range accuracy and range resolution capabilities. The results show that the system was limited by ground clutter and the performance of the test equipment available. However, given the right equipment in an airborne environment the accuracy desired for the system is possible. GRA

N85-27123# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
A STUDY OF COMPUTATIONAL TECHNIQUES FOR NONCANONICAL MICROSTRIP ANTENNAS AND ARRAYS Final Report, Aug. 1981 - Nov. 1983
J. J. H. Wang Griffiss AFB, N.Y. RADC Jan. 1985 55 p
(AF Proj. 2305)
(AD-A152216; RADC-TR-85-9) Avail: NTIS HC A04/MF A01 CSCL 09/5

Three major tasks were performed on the analyses of microstrip antennas and arrays with noncanonical patch shapes. All three efforts include the development of computer programs for analysis of a broad class of antenna configurations. The first task which was intended to provide a basis for microstrip antenna analysis, was the development of a general numerical method for analysis of an arbitrary Hertzian dipole in general stratified media. The Hertzian dipole can be vertical or horizontal, electric or magnetic. The media is a multi-layer with arbitrary layer thicknesses, and complex dielectric constants. The second task is the development of a computer algorithm for microstrip antennas in terms of an equivalent horizontal magnetic current along the periphery of the patch. The complex distribution of this magnetic current is determined by requiring that the radiated fields on the patch surface vanish. Although numerical convergence was not achieved. This technique is considered promising and continued research is recommended. Research on microstrip arrays was conducted for diode-switched microstrip panels with a radom cover. A moment method approach was taken with the aperture expanded in terms of exponential basis functions and a single mode in the diode-gap region. The computer program developed was checked against known data for the reflection and transmission of the basic sandwiched screen structure. Application of these techniques can be found not only in microstrip antenna and arrays, but alse in integrated circuits and geophysics. GRA

N85-27124# Princeton Univ., N. J. Information Sciences and Systems Lab.
ROBUST DETECTION OF FADING NARROW-BAND SIGNALS IN NON-GAUSSIAN NOISE
M. Weiss and S. C. Schwartz Feb. 1985 126 p
(Contract N00014-81-K-0146)
(AD-A152262; TR-17) Avail: NTIS HC A07/MF A01 CSCL 09/4

In this report, we study procedures for robust detection of slowly fading narrowband signals in nearly Gaussian noise, a common model for radar/sonar systems. For the classical quadrature matched filter test, we introduce an uncertainty about the envelope statistic and develop a robust test for this one-sample situation. It is demonstrated that this test is capable of protecting only against relatively weak contaminations. With uncertainty taken directly on the noise samples, we develop an estimation-detection theoretic approach: The detection statistic preserves the structure of the quadrature matched filter, but in place of the linear sample mean, a minimax robust estimator of the random amplitude is substituted. This test is shown to be asymptotically maximin optimal (in the sense of Huber) for a wide family of decision rules and for several common target signal models. GRA

N85-27125# California Univ., Livermore. Lawrence Livermore Lab.
SIGNAL PROCESSING FOR THE ANALYSIS OF TRANSIENT ELECTROMAGNETIC DATA
V. G. McGevna Jan. 1985 77 p refs
(Contract W-7405-eng-48)
(DE85-007244; UCID-20304) Avail: NTIS HC A05/MF A01

The analysis of transient electromagnetic data is complicated

by limitations in the experimental setup, the data acquisition system, and even by the analysis techniques employed. An extension to the more commonly used analysis techniques is presented and it is demonstrated how more useful information can be extracted from transient measurements. A comparison is provided between time domain and frequency domain spectral analysis techniques, and examples are given of how physical insight can be used in the preprocessing of data to greatly reduce noise in Fourier transforms of data. The power spectra density function (PSD) is introduced as a useful way of characterizing reflection data where only a short data segment from a lightly damped ringdown is available. Finally, the coherence function is introduced as a technique for establishing limitations, such as the maximum useful frequency, in the data being processed. DOE

N85-27126# National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.

SESC (SPACE ENVIRONMENT SERVICES CENTER) SATELLITE BROADCASTING 10-YEAR PLAN

K. L. Carran Jan. 1985 37 p
(PB85-163541; NOAA-TM-ERL-SEL-70) Avail: NTIS HC A03/MF A01 CSCL 17B

Within 10 years Space Environment Services Center will have a fully operational satellite broadcast system, capable of delivering alerts, forecasts, indices, and data in real time, on a 24-hour basis, to the continental United States including parts of Hawaii, and some of Canada and Mexico. The rationale for a 10-year plan is as follows: (1) this broadcast system utilizes proven state-of-the-art technology; (2) there is tremendous potential for geographic expansion to other countries; (3) receipt and distribution of data are convenient and economical; (4) the speed of service is excellent; (5) the overall cost is reasonable; and (6) the format and type of data broadcast is flexible and can be changed to meet customer demands. GRA

N85-27127# Senior Interagency Group on International Communication and Information Policy, Washington, D.C.

WHITE PAPER ON NEW INTERNATIONAL SATELLITE SYSTEMS

Feb. 1985 70 p
(PB85-162501) Avail: NTIS HC A04/MF A01 CSCL 17B

Background information regarding the President's determination is reported and provides information on important regulatory and other parallel measures which are desirable to ensure that the Executive branch's fundamental policy goal, an efficient and responsive international communications environment, is achieved. The major communications and information policy issues raised by the applications before the FCC are discussed. Commercial, trade, and legal matters, and also major U.S. foreign policy interests and concerns are addressed. The report, however, consolidated much of the extensive analysis that was undertaken by the Executive branch and sets for the requirements applicable to any system that FCC may eventually authorize. GRA

N85-27128# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

THE IMPACT OF PROPOSED RADIO FREQUENCY RADIATION STANDARDS ON MILITARY OPERATIONS

Loughton, England Mar. 1985 171 p refs Lectures were held in Rome, 11-12 Apr. 1985, in Lisbon, 15-16 Apr. 1985, and in Paris, 18-19 Apr. 1985
(AGARD-LS-138; ISBN-92-835-1494-7) Avail: NTIS HC A08/MF A01

The development and application of devices that emit radiofrequency radiation (RFR) have significantly increased the quality of life throughout the world. Yet in recent years the beneficial aspects of the radiofrequency/microwave technology have been somewhat overshadowed by a public fear of potential biological effects. This fear, in turn, has incresed RFR research, lead to a much better understanding of the interactions of RFR fields and biological systems, and resulted in the promulgation of new RFR safety guidelines. Subject areas covered are: (1) the physical interactions of RFR fields with biological systems, (2) the biological effects of RFR exposures, (3) the procedures for measuring RFR fields in military operations, and (4) the development and operational impact of new RFR safety guidelines. For individual titles, see N85-27129 through N85-27138.

N85-27129# Utah Univ., Salt Lake City. Dept. of Electrical Engineering.

THE PHYSICAL INTERACTIONS OF RADIOFREQUENCY RADIATION FIELDS AND BIOLOGICAL SYSTEMS c51

Carl H. Durney *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 19 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

A biological system irradiated by radiofrequency radiation (RFR) responds to the internal RFR fields produced by that irradiation. The measurement and calculation of the internal fields is called dosimetry. The internal fields are often described in terms of the specific absorption rate (SAR) in watts/kilogram. SARs are usually determined experimentally by measuring temperature rise in the absorber (either by discrete probes or thermographic cameras) or by directly measuring the internal electric field. A combination of techniques, each valid for a particular model and in a particular frequency range, are used to calculate average whole body SARs for models of human beings and other animals over a wide frequency range for plane wave irradiation. Calculating SARs for near field irradiation is much more difficult than for plane wave irradiation; thus fewer near field SAR data are available. To calculate the spatial distribution of SARs is still more difficult (especially at higher frequencies); this problem in dosimetry is yet to be solved satisfactorily, although significant progress has recently been made in this area. Author

N85-27130# Washington Univ., Seattle. Bioelectromagnetics Research Lab.

THERMAL CONSEQUENCES OF LOCALIZED SAR FROM RFR EXPOSURES c52

A. W. Guy *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 18 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

Local SAR levels from 50 to 170 W/kg are used for theraputic heating in clinical medicine. These levels cause tissue temperatures to rapidly increase and stimulate a rapid increase in blood flow. Localized high levels of SAR destroy tumors with minimal damage to healthy surrounding tissue due to the difference in blood cooling rates and thermal sensitivity of neoplastic as compared to normal tissues. SARs of 140 W/kg or greater produce cataracts in the eyes of rabbits that are exposed locally to 150 mW/sq cm cm 2450 MHz microwave radiation but similiar levels of exposure does not produce cataractogenic levels of SAR in primates. Experiments show that SAR levels of 72 W/kg or greater applied for 1.5 to 6 min to the brain of cats will produce temperature rise of 4.4 to 6.5 C resulting in pulse rate increases, hyperventilation, bradycardia, and intense tachypnea for 15 to 20 minutes after exposure. No pathological changes are noted in the cat due to these localized exposure levels. Localized exposure of living cat brain at SAR levels of 2.5 to 5 W/kg produce measureable temperature rises and change sin latency of evoked potentials. A thermal response occurring at the lowest known level of applied energy is that of microwave pulse hearing. Author

N85-27131# Rochester Univ., N. Y. Dept. of Medicine.

THE BIOLOGICAL EFFECTS OF RADIOFREQUENCY RADIATION c51

Norbert J. Roberts, Jr. and Sol M. Michaelson *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 26 p refs (For primary document see N85-27128 16-32)
(Contracts F33615-84-C-0608; DE-AC02-76EV-03490; Grants NIH-N01-AL-15547; NIH-N01-ES-03239)
Avail: NTIS HC A08/MF A01

Exposure of the general public and in particular certain occupational groups to radiofrequency radiation (RFR) is ubiquitous

and of growing concern. No clear and widely accepted understanding of the biological effects and health implications of such RFR exposure has emerged. The data available, including reports of RFR effects on single cells or cell components, on genetic composition or development, on developed organs, tissues, or cell systems, and on integrative and regulatory biological systems are reviewed. Reports of RFR effects on the immunological system with consideration of the influence of neuroendocrine responses, are critically reviewed in greater detail to illustrate important points regarding data acquisition and assessment, and understanding and application of the RFR bioeffects literature in general. Factors affecting RFR bioeffects research are reviewed, and recommendations for future studies are provided. Author

N85-27132# School of Aerospace Medicine, Brooks AFB, Tex.
THE CUMULATIVE EFFECTS OF LONG TERM EXPOSURE TO LOW LEVELS OF RADIOFREQUENCY RADIATION (RFR) c52
Jerome H. Krupp *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 14 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

One of the concerns for the effects of nonionizing radiofrequency radiation (RFR) is the accumulation of subtle injury over a long period of time, resulting in a delayed expression of deleterious effect. Of the more than 6,000 articles in the literature today, the vast majority involve acute exposures at levels where significant thermal energy is deposited. The resulting effects, in most cases, could be explained on the basis of the specific energy absorption, expressed as watts per kilogram (W/kg), with a generally accepted threshold for effects of 4 W/kg. The advocacy of nonthermal mechanisms by means of mathematical modeling, theoretical predictions, and in vitro studies, raised the possibility of subtle injury or alteration in function which, over time, would be expressed as a harmful bioeffect. Over a 4-year period of planning, pilot study, and definitive experiment, a lifetime exposure is given to a population of tst animals (100) whose state of health, growth, and cause of death are closely monitored. An equal number of sham expected animals served as a comparison population. After 25 months of exposure, and at the point where there is 90% mortality in both groups, the remaining subjects are sacrificed and assayed. The overall conclusion is that no cumulative ill effects could be attributed to the life long exposure at absorption rates of 0.4 W/kg or less. Author

N85-27133# Air Force Occupational and Environmental Health Lab., Brooks AFB, Tex.
THE MEDICAL RESULTS OF HUMAN EXPOSURES TO RADIO FREQUENCY RADIATION c52
R. B. Graham *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 8 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

The United States Air Force conducted a clearly defined and effective radio frequency radiation (RFR) protection program since 1970. As an important part of the program, since 1972 the Air Force Medical Service investigated RFR exposure incidents involving more than 330 individuals; of which 58 are determined to have been actually overexposed with another 17 found to have been inconclusive. Medical evaluations of the exposes are extensive and the findings almost universally unremarkable. A short history of the program's evolution is presented and some examples of exposure incidents and some general impressions of the clinical evaluations of the confirmed exposees are also presented. Author

N85-27134# Rochester Univ., N. Y. Dept. of Medicine.
REVIEW OF EPIDEMIOLOGICAL STUDIES OF HUMAN EXPOSURES TO RADIOFREQUENCY RADIATION c52
Norbert J. Roberts, Jr. and Sol M. Michaelson *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 6 p refs (For primary document see N85-27128 16-32)
(Contracts F33615-84-C-0608; DE-AC02-76EV-03490; Grants NIH-N01-AL-15547; NIH-N01-ES-03239)
Avail: NTIS HC A08/MF A01

The health effects of exposure to radiofrequency radiation (RFR) remain undefined and controversial. Epidemiological studies of human exposures to RFR are confounded by difficulties in determining the type and true extent of exposures, in selecting an appropriate control group for comparisons, in determining the existence and influence of many concomitant environmental factors, and in establishing the presence or measuring the frequency or severity of subjective complaints as well as objective findings in the studied populations. Reported RFR effects on general health, growth and development, physiological systems such as the cardiovascular and nervous systems, and organs such as the eye are reviewed. Criteria for reliable epidemiological studies are presented to allow critical analysis of such reports. Author

N85-27135# Bundesgesundheitsamt, Neuherberg (West Germany). Inst. for Radiation Hygiene.
EVALUATION OF HUMAN EXPOSURES TO LOW FREQUENCY FIELDS c52
Juergen H. Bernhardt *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 18 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

The biophysical model concept described might be suited as a basis of discussion to determine and define limits of exposure to electric or magnetic fields below 100 kHz, including 50/60 Hz. The electric field strength within the tissue in the environment of excitable neurons and muscle cells is considered decisive for the biological effect. Threshold values of field strength or current density, inducting biological effects are compiled from experimental and theoretical studies. On the basis of these data it is possible to establish safe, dangerous and hazardous current density curves as a function of frequency. The criterion for the definition of injury is the elicitation of ventricular fibrillation which must be avoided. To define exposure limits, the field strength or current density causing injury should be reduced by a factor exceeding 100. The arguments supporting this wide safety margin are discussed. The electric and magnetic field strength in the human environment is correlated with the corresponding electric current density induced in the human body. This enable safe, dangerous and hazardous levels of current density in the human body to be correlated with the external electric or magnetic field strength. Parts of the concept presented are adopted as the scientific basis for the lower frequency range of the standard DIN 57848/VDE 0848: Hazards by electromagnetic fields; Protection of persons in the frequency range from 10 kHz to 3.000 GHz. Author

N85-27136# Washington Univ., Seattle. Center for Bioengineering.
HAZARDS OF VLF ELECTROMAGNETIC FIELDS c52
Arthur W. Guy *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 20 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

Biological hazards to humans exposed to Very Low Frequencies (VLF) electromagnetic fields may result from electric shock, spark discharge, elevation of tissue temperature and burns. A number of nonthermal nonshock effects, such as the neurasthenic syndrome are reported widely in the Soviet and East-European literature. Generally a subject exposed to even the highest electromagnetic fields in the environment will not experience an electric shock unless he comes in contact with the ground or objects such as vehicles, crane cables and guy wires. The steady state current from touching objects increases directly with the frequency. On the other hand, the physiological shock effects of the current are less pronounced with increasing frequency. However, at frequencies where the shock hazard is negligible, deleterious heating of the body occurs for whole body average Specific Absorption Rates (SAR) greater than 4 W/kg and localized values of SAR greater than 80 W/kg so VLF exposure levels should be limited to prevent SAR from reaching one tenth of these levels. Free space exposures to fields of less than 1 kV/m

electric field strength should be safe if proper precautions are taken to limit direct body contact with conducting objects. Author

N85-27137# School of Aerospace Medicine, Brooks AFB, Tex.
DEVELOPMENT AND APPLICATION OF NEW RADIOFREQUENCY RADIATION SAFETY STANDARDS c52
John C. Mitchell *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 13 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

Radiofrequency radiation (RFR) is defined to cover the frequency range from 10 kHz to 300 GHz and includes microwaves. Absorption and distribution of RFR are strongly dependent on the size of the irradiated object and the frequency of the incident energy. It is common practice to report biological effects of RFR as a function of specific absorption rate (SAR) expressed as W/kg. The most widely held view is that the threshold for adverse effects lies above 4 W/kg. This value underlies the rationale for most standards that have emerged since 1982. Using a safety factor of 10, the American National Standards Institute developed RFR protection guides that limit all human whole body exposures to incident energy that results in an SAR no greater than 0.4 W/kg. This allows incident average power densities from 1 to 100 mW/cm2, depending on the frequency of the radiation. New safety guidelines are compared with many other RFR standards used throughout the world today including NATO STANAG 2345. Author

N85-27138# Air Force Occupational and Environmental Health Lab., Brooks AFB, Tex.
RADIO FREQUENCY RADIATION (RFR) MEASUREMENTS IN OPERATIONAL SETTINGS
R. B. Graham *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 10 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

A detailed discussion of the principles, procedures, and instrumentation required to carry out routine RFR measurements under field or operational conditions is presented. The information herein contained comes largely from several years of experience gathered by the USAF Occupational and Environmental Health Laboratory (USAF OEHL) and its predecessor the USAF Radiological Health Laboratory (USAF RHL). Over the last 12 years the USAF OEHL have evaluated and field tested a wide variety of RFR power density instrumentation designed, developed and manufactured by a number of firms and agencies. Each of these instruments has some outstanding characteristics and some equally poor features. Based on a number of years of experience only about 15% of the RFR emitters account for about 95% of the measurement problems. There are a number of classes of emitters that may be easily and promptly dismissed from consideration as a potential hazard to personnel. Author

N85-26798# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF TROPICAL F REGION IN IONOSPHERE ON PROPAGATION OF SHORT RADIO WAVES Abstract Only
O. P. Kolomiytsev and P. P. Savchenko *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 21-22 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 740-747 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27023# Tohoku Univ., Sendai (Japan). Dept. of Communication Engineering.
HISTORICAL PERSPECTIVES ON INFORMATION TRANSMISSION ENGINEERING
Risaburo Sato *In its* The Record of Elec. and Comm. Eng. Conversazione, Vol. 53, No. 2, Nov. 1984 Nov. 1984 p 1-14 In JAPANESE (For primary document see N85-27022 16-31)
Avail: NTIS HC A04/MF A01

N85-27304# Joint Publications Research Service, Arlington, Va.
SYNTHETIC APERTURE SIDE-LOOKING RADAR IMAGE ADJUSTMENT
Yuan Huikun *In its* China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 82-86 refs Transl. into ENGLISH from Guanxue Xuebao (Shanghai), v. 4, no. 8, 1984 p 756-759 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

N85-27313# Joint Publications Research Service, Arlington, Va.
RESULTS OF SIMULTANEOUS MEASUREMENTS OF ABSORPTION AND POLARIZATION OF RADIO WAVES REFLECTED FROM IONOSPHERE Abstract Only
I. Khandovietov *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 99 Transl. into ENGLISH from Izv. Akad. Nauk Turkm. SSR: Ser. Fiz.-Tekhn., Khim. i Geol. Nauk (Ashkhabad), no. 4, 1984 p 37-43 Original language document was announced in IAA as A85-24073 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

N85-27336# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
A PHASE MODULATION EVALUATION PROCEDURE FOR AN ARGOS TYPE SIGNAL
Nadov Levanon *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 22 p (For primary document see N85-27333 16-43)
(Contract N00024-83-C-5301)
Avail: NTIS HC A16/MF A01

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N85-27139 Department of the Navy, Washington, D. C.
SWITCHING MIXER Patent
A. R. Hislop, inventor (to Navy) Issued 8 Jan. 1985 4 p (AD-D011602; US-Patent-4,492,960; US-Patent-Appl-SN-340397; US-Patent-Class-343-5) Avail: US Patent and Trademark Office CSCL 09/3

An RF system is disclosed in which the input mixer of the system is also used as a switch to allow the local oscillator to be used as the transmitter oscillator. The switching mixer may also be used as an attenuator or signal modulator. A local oscillator is connected via a filter to a 90 3 db hybrid coupler. Two of the four ports of the hybrid coupler are coupled through impedance matching networks to reversely polarized mixer diodes. Bias circuits are connected to the mixer diodes for variaby adjusting the bias current to the mixer diodes to thereby adjust their reflection/absorption characteristics. A second filter is connected between the first filter and the hybrid coupler for extracting an intermediate frequency signal. A third filter is connected to the fourth port of the hybrid coupler and to the antenna of the RF system. The first and third filters pass RF and local oscillator signals and block IF signals. Author (GRA)

N85-27140 Department of the Navy, Washington, D. C.
WAVELENGTH MULTIPLEXER-DEMULTIPLEXER Patent
S. K. Sheem, inventor (to Navy) Issued 20 Nov. 1984 10 p Supersedes AD-D010231
(AD-D011608; US-Patent-4,483,582; US-Patent-Appl-SN-142951; US-Patent-Class-350-96.15) Avail: US Patent and Trademark Office CSCL 20/6

A multiwavelength multiplexer-demultiplexer constructed from units each capable of multiplexing or demultiplexing two wavelengths is described. As many such units as required can be interconnected to form multiplexer-demultiplexers of any number of wavelengths. Each two-wavelength multiplexer-demultiplexer unit

includes a four-port power divider, a four-port phase shifter having two ports connected to two ports of the phase shifter. The power divider may be a single-mode optical fiber directional coupler, or a half-silvered mirror beam splitter, The phase shifter may include a pair of single mode optical fibers or a pair of oppositely disposed mirrors. GRA

N85-27141 Department of the Navy, Washington, D. C.
OPTICALLY TRIGGERED TRANSFERRED-ELECTRON DEVICE MICROWAVE BURST AND SINGLE PULSE GENERATORS Patent
T. F. Carruthers, J. F. Weller, and H. F. Taylor, inventors (to Navy) Issued 6 Nov. 1984 11 p
(AD-D011614; US-Patent-4,481,485; US-Patent-Appl-SN-345454; US-Patent-Class-331-66) Avail: US Patent and Trademark Office CSCL 09/1

Transferred-electron device (TED) microwave burst and single pulse generators which are triggered by pico-second optical pulses. The burst generator includes a TED having a cathode, an anode, and a gate electrode positioned therebetween, all located on a semiconductor substrate. An optical pulse applied to the substrate between the gate and anode electrodes causes a plurality of space charge domains to sequentially travel from the gate to the illuminated region thereby causing an oscillatory burst of current to occur in the external leads of the TED. The frequency of the burst is proportional to the distance between the gate and the illuminated region and the burst duration is proportional to the optical pulse amplitude and/or duration. Alternatively, the burst generators may be formed from a two terminal TED with the cathode electrode being treated as the gate. A single pulse generator may be formed by applying an optical pulse to the substrate between the cathode and the gate of a three terminal TED. The duration of the single pulse is proportional to the distance between the gate and the anode. GRA

N85-27142 Department of the Army, Washington, D. C.
SUPPRESSION OF VIBRATION EFFECTS ON PIEZOELECTRIC CRYSTAL RESONATORS Patent
V. J. Rosati, inventor (to Army) Issued 5 Jun. 1984 5 p Supersedes AD-D009255
(AD-D011625; US-Patent-4,453,141; US-Patent-Appl-SN-343644; US-Patent-Class-331-158) Avail: US Patent and Trademark Office CSCL 09/1

An active method and apparatus for suppressing or cancelling the effects of vibration on quartz crystal controlled oscillators by generating an electrical signal which is a replica of the vibration acting on the crystal resonator, which signal is thereafter properly phased and applied directly to the crystal electrodes which thereby operates to substantially eliminate unwanted vibration-induced sidebands in the signal output of the oscillator. GRA

N85-27143 Department of the Army, Washington, D. C.
ACCELERATION RESISTANT COMBINATION OF OPPOSITE-HANDED PIEZOELECTRIC CRYSTALS Patent
J. R. Vig and A. D. Ballato, inventors (to Army) Issued 10 Aug. 1982 5 p
(AD-D011626; US-Patent-4,344,010; US-Patent-Appl-SN-086504; US-Patent-Class-310-361) Avail: US Patent and Trademark Office CSCL 09/1

An acceleration resistant crystal features two crystals mounted together with at least two axes of each crystal being in antiparallel relationship with respect to corresponding axes of the other crystals. The two crystals can be chiral pairs and thus have three corresponding axes in antiparallel relationship for acceleration resistance in any arbitrary direction with respect to the crystal axes. GRA

N85-27144 Department of the Army, Washington, D. C.
ACCELERATION-RESISTANT CRYSTAL RESONATOR Patent
R. L. Filler, inventor (to Army) Issued 18 Oct. 1983 4 p Supersedes AD-D009599
(AD-D011627; US-Patent-4,410,822; US-Patent-Appl-SN-389315; US-Patent-Class-310-311) Avail: US Patent and Trademark Office CSCL 09/1

A crystal resonator features two crystals mounted such that the acceleration sensitivity vector of one crystal is in an antiparallel relationship to the acceleration sensitivity vector of the other crystal. The composite resonator eliminates acceleration-induced frequency shifts for acceleration in all directions. GRA

N85-27145 Department of the Army, Washington, D. C.
METHOD OF FABRICATING ACCELERATION RESISTANT CRYSTAL RESONATORS AND ACCELERATION RESISTANT CRYSTAL RESONATORS SO FORMED Patent
A. D. Ballato and J. R. Vig, inventors (to Army) Issued 21 Dec. 1982 5 p Supersedes AD-D007906
(AD-D011630; US-Patent-4,365,182; US-Patent-Appl-SN-196508; US-Patent-Class-310-361) Avail: US Patent and Trademark Office CSCL 09/1

An acceleration resistant crystal resonator is made from a single quartz plate that is optically twinned into a left-handed (LH) quartz portion and a right-handed (RH) quartz portion. According to the method, the optically twinned single quartz plate is formed into a resonator plate wherein the effective thickness of the (LH) portion is substantially the same as the effective thickness of the (RH) portion. The resonator plate is then mounted and bonded to the support structure of a crystal resonator enclosure. A pair of electrodes is then deposited onto the (LH) portion and a pair of electrodes deposited onto the (RH) portion. The thickness of the two pairs of electrodes is then adjusted so that the resonant frequency of the resonator on the (LH) portion is substantially the same as the resonant frequency of the resonator on the (RH) portion. The pairs of electrodes are then interconnected to each other and to an oscillator circuit so that in-phase vibration of the two portions is assured. The enclosure is then hermetically sealed. GRA

N85-27146 Department of the Army, Washington, D. C.
ACCELERATION SENSITIVITY REDUCTION METHOD Patent
J. R. Vig and R. L. Filler, inventors (to Army) Issued 29 May 1984 3 p Supersedes AD-D009867
(AD-D011631; US-Patent-4,451,755; US-Patent-Appl-SN-434998; US-Patent-Class-310-361) Avail: US Patent and Trademark Office CSCL 09/1

The acceleration sensitivity of an AT-cut quartz crystal plate resonator is reduced by replacing the quartz crystal plate of the resonator with a quartz crystal plate having a flatter plate contour. GRA

N85-27147# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SYSTEM DESIGN OF AUTOMATED VLSI (VERY LARGE SCALE INTEGRATED) TEST STATION AND IMPLEMENTATION OF SELECTED SYSTEM ASPECTS M.S. Thesis
S. Tariq Dec. 1984 302 p
(AD-A151961; AFIT/GE/EE/84D-27) Avail: NTIS HC A14/MF A01 CSCL 09/5

Automated Test Station for VLSI (ATV) is a system design to ascertain correct functioning of a VLSI circuit. It is intended to test an Integrated Circuit (VLSI) by using Standard IC Tester, (developed at Standford University, California). The tester has the capability of addressing, simulating, and measuring status of any pin of its test connector, to which an ICUT (IC Under Test) is attached. The test vectors to simulate the ICUT and reference data to analyze the response of an ICUT are extracted from ESIM files in VAX-11/780 computer system and stored on 8 in. floppy disks to be utilized with microcomputer. These ESIM files, typically produced during Computer Aided Design phase of a VLSI circuit, contain node data generated during its simulator run. The LSI-11/23 microcomputer will be used to control the functions of IC tester and provide test and reference data. The user will have the capability to guide the course of operation by selecting various operating options in an interactive manner. Originator-supplied keywords include: VLSI testing; Microcomputer; and Computer programs. GRA

N85-27148# Naval Postgraduate School, Monterey, Calif.
PULSEWIDTH MODULATED SPEED CONTROL OF BRUSHLESS dc MOTORS M.S. Thesis
A. A. Askinas Sep. 1984 67 p
(AD-A151966) Avail: NTIS HC A04/MF A01 CSCL 10/2

Until recently, few alternatives existed for the use of hydraulic and pneumatic actuators in primary flight control applications. With the advent of the samarium-cobalt permanent magnet brushless DC motor, consideration must now be given to the utilization of an electromechanical actuator in missiles which require significant maneuvering capability and hence, greater torques. This thesis investigates the theory and techniques of pulse width modulator speed control of brushless DC motors. After describing basic pulse width modulation (PWM) concepts, two constant velocity control schemes are presented: current feedback and a limit cycle scheme. By calculating the motor form factor (a figure of merit for power losses in the switching transistors which comprise the PWM network), the relative worth of each scheme is then evaluated. An in depth study is conducted of the limit cycle approach, with an emphasis on the power loss reductions obtained through the reduction of the velocity limit settings. Author (GRA)

N85-27149# Naval Underwater Systems Center, New London, Conn.
THEORETICAL AND EXPERIMENTAL COMPARISONS OF NEARFIELD ELECTROGALVANIC FIELDS DUE TO NONLINEAR POLARIZATION LAYERS
Rolf G. Kasper 13 Feb. 1985 42 p
(RR0-1411; RR0-2208)
(AD-A152085; NUSC-TR-7299) Avail: NTIS HC A03/MF A01 CSCL 14/2

Based on completed experimental electric-field scans and the corresponding finite-element field predictions, it appears that the finite-element numerical technique presents a strong analytical tool in calculating the nearfield (within 650 micrometers electric-field distributions about active microcells. This was analytically achieved with the new double membrane finite-element configuration representing nonlinear polarization and by using a local tangent slope (impedance) definition dependent on the local potential difference. The experimental determination of the normal current was realized with a newly developed scanning vibrating electrode technique. The finite-element model utilizes a priori measured uncoupled polarization curves for pure iron and pure copper. The current densities and the electric field intensity was calculated for all the grid points within the electrolyte and on its boundaries. Results appear to indicate that first order anodic mass loss can be predicted using finite-element predicted current density distributions on the anodic surface and the imposition of Faraday's law. The electric-field correlation established for the normal current-density vector provides the confidence to proceed in the evaluation of electric fields associated with pitting and crevice corrosion. GRA

N85-27150# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
ELECTRICAL RESISTIVITY IN AMORPHOUS METALS: CONSEQUENCES OF PHONON INEFFECTIVENESS IN THE DIFFRACTION MODEL Final Technical Report
L. V. Meisel and P. J. Cote Jan. 1985 54 p
(AD-A152130; AD-E440272; ARLCB-TR-85001) Avail: NTIS HC A04/MF A01 CSCL 20/3

Electrical transport in amorphous metals is analyzed in the context of the Baym-Faber-Ziman theory. The theory is generalized to incorporate electron mean free path effects through the Pippard-Ziman condition on the electron-phonon interaction. A variety of model t-matrices are considered. The geometrical structure factors are modeled by Percus-Yevick hard sphere forms and a single branch Debye phonon spectrum is assumed. Detailed results for electrical resistivity rho vs. temperature T and the TCR are presented for extensive ranges of 2kF/kp and electron mean free path. The results, incorporating the Pippard-Ziman condition, are consistent with the observed rho vs. T in low resistivity glassy metals. However, although inclusion of the Pippard-Ziman condition dramatically improves agreement with the data, quantitative agreement is not obtained in high resistivity amorphous metals. GRA

N85-27151# Battelle Columbus Labs., Ohio.
SIXTH DOE ELECTROCHEMICAL CONTRACTOR'S REVIEW. EXTENDED ABSTRACTS
D. Sheppard, comp. and J. Hurwitch, comp. Jun. 1984 234 p refs Review held in Washington, D.C., 25-29 Jun. 1984 Prepared in cooperation with Battelle Pacific Northwest Labs., Richland, Wash.
(Contract DE-AC06-76RL-01830)
(DE84-013679; CONF-840677-Summ) Avail: NTIS HC A11/MF A01

Papers presented are summarized. Separate abstracts were prepared for each summary for inclusion in the Energy Data Base. Topics reviewed include: sodium-sulfur battery research; battery performance and testing; battery analysis; flow batteries; lithium rechargeable batteries; alkaline batteries; metal/air batteries; fuel cells; and electrochemical processes. DOE

N85-27152# Los Alamos Scientific Lab., N. Mex.
GENERALIZATION OF THE CHILD-LANGMUIR RELATION FOR 1-DIMENSIONAL TIME-DEPENDENT DIODES
A. Kadish, W. Peter, and M. E. Jones Nov. 1984 10 p refs
(Contract W-7405-eng-36)
(DE85-007386; LA-10207-MS) Avail: NTIS HC A02/MF A01

A simple time dependent relationship between the applied voltage pulse and the extracted current in a one dimensional diode has been derived. The relation is applicable to diodes when the applied voltage changes appreciably during the beam front transit time across the diode gap. A simple application to the elimination of ion doide current transients is presented. DOE

N85-27153# Brookhaven National Lab., Upton, N. Y.
OPERATIONAL TEST RESULTS OF A PROTOTYPE SUPERCONDUCTING POWER TRANSMISSION SYSTEM AND THEIR EXTRAPOLATION TO THE PERFORMANCE OF A LARGE SYSTEM
E. B. Forsyth, Sr. and R. A. Thomas 1985 10 p refs Presented at IEEE Power Eng. Soc. Summer Meeting, Vancouver, British Columbia, 14 Jul. 1985
(Contract DE-AC02-76CH-00016)
(DE85-006731; BNL-35945; CONF-850704-2) Avail: NTIS HC A02/MF A01

Superconducting cables have electrical characteristics which are similar to overhead lines in many ways. They are suitable for long-distance circuits of relatively high power and are not similar or competitive with conventional underground cables and their usual applications. The testing of a prototype superconducting ppower transmission system has progressed to those of an operational nature such as unattended life tests, emergency ratings and simulated failure of the cooling system. Results are used to calculate the performance of a transmission system comprising 2 circuits in a route 100 miles long with a 1000 MVA rating. In addition the measured performance is compared with systems studies made during the development phase. DOE

N85-27154# General Electric Co., Largo, Fla. Neutron Devices Dept.
ROBOTIC THERMAL BATTERY PELLET FABRICATION
D. L. Kimbler, A. S. Townsend, R. D. Walton, and C. W. Jones 1 Mar. 1985 57 p refs
(Contract DE-AC04-76DP-00656)
(DE85-007755; GEPP-TIS-858a) Avail: NTIS HC A04/MF A01

Thermal battery manufacturing at the General Electric Neutron Devices Department (GEND) is a sequence of operations involving materials processing, component manufacture, and assembly. These operations, for the most part, were manually performed although some operation were computer or fixture assisted. The high labor intensity and the need for process consistency in these operations made the conversion to a robotic work cell appealing in that it could increase productivity while allowing the reassignment

of highly trained workers to other duties. An Alpha robot (Microbot. Inc.) was coupled with a Hewlett-Packard HP-9816 microcomputer and custom software was developed to control the thermal battery manufacturing process. The software provided a menu driven main program with feedback at virtually every step to allow technicians with little or no computer experience to operate the system. Previously, one or two workers were assigned to each of several industrial presses used in the manufacture of thermal batteries. With the introduction of a robotic operator and a microcomputer process control, one worker alone could support two to three presses. DOE

N85-27155# Sandia Labs., Albuquerque, N. Mex.
RADIATION HARDENING FOR VLSI APPLICATIONS
P. V. Dressendorfer, P. S. Winokur, J. R. Schwank, P. J. McWhorter, E. B. Errett, F. W. Sexton, D. M. Fleetwood, and J. D. McBrayer 1985 6 p refs Presented at the Symp. on VLSI Technol., Kobe, Japan, 14 May 1985
(Contract DE-AC04-76DP-00789)
(DE85-005493; SAND-84-2665C; CONF-850580-1) Avail: NTIS HC A02/MF A01

Techniques developed to separate bulk oxide trapped charge from interface trapped charge in MOS devices are discussed, and then illustrates how these techniques may be used to engineer the Si/SiO2 interface to reduce charge trapping and trap generation by altering various processes used in the manufacture of integrated circuits. The process techniques which result in improved hardness are then shown to also result in reduced degradation from hot carrier effects. DOE

N85-27156# McElroy (Ralph) Co., Austin, Tex.
MATERIAL FOR ELECTRODES OF PULSED AND ARC SOURCES OF LIGHT
S. I. Faifer, V. I. Morokov, E. S. Savranskaya, V. I. Ionov, A. K. Digoev, P. F. Kuznetsov, and A. I. Korotkii Feb. 1985 4 p Transl. into ENGLISH of Russian Patent no. 444,269 (Appl. no. 1905888/24-7, 13 Apr. 1973)
(Contract W-7405-eng-48)
(DE85-007453; UCRL-Trans-12037) Avail: NTIS HC A02/MF A01

A material for the electrodes of pulsed and arc sources of light, which is made from tungsten with uniformly distributed samarium oxide is described. Improvement of the erosion resistance of the electrodes, the stability of parameters and the lifespan of lamps, and the concentration of samarium oxide from 3 to 15 wt % is sought. DOE

N85-27157# McElroy (Ralph) Co., Austin, Tex.
METHOD OF FABRICATING MATERIAL FOR THE ELECTRODES OF GAS DISCHARGE DEVICES
E. S. Savranskaya, L. N. Bykov, S. I. Faifer, and A. N. Tumanov Feb. 1985 4 p Transl. into ENGLISH of Russian Patent no. 492,950 (Appl. no. 1950260126-25, 3 Aug. 1973)
(Contract W-7405-eng-48)
(DE85-007452; UCRL-Trans-12038) Avail: NTIS HC A02/MF A01

A method is claimed of manufacturing a material for the electrodes of gas discharge devices based on an alloy of a refractory metal, for example, tungsten, with metals of the iron group, for example nickel, and an additive of an alkaline earth oxide. The method is distinguished by the fact that, with the goal of improving the uniformity of distribution of the components in the material, a suspension is prepared from tungstic anhydride, the tungstate of the alkaline earth metal and a water-soluble salt of nickel, a precipitating agent, for example, ammonium carbonate, is added to the suspension, and after formation of the nickel carbonate the resulting mixture is filtered, calcined in air and reduced in hydrogen. DOE

N85-27158# Bendix Corp., Kansas City, Mo.
BOND TEST DATA ACQUISITION AND ANALYSIS SYSTEM
Dennis D. Long and James R. Harte Feb. 1985 8 p ref
(Contract DE-AC04-76DP-00613)
(DE85-007021; BDX-613-3161R) Avail: NTIS HC A02/MF A01

The Microelectronics Departments at Bendix Kansas City manufacture thick- and thin-film chip and wire hybrid circuits, Leadless Chip Carrier (LCC) subhybrids, surface mount thick-film hybrids, RF thin-film hybrids, and packaging of Large Scale Integrated Circuits (LSI's). All of these circuits are manufactured for high reliability applications which require extensive bond testing to verify product quality. This system was designed and set up initially to acquire wire bond pull testing data (destructive and nondestructive) and component shear testing data, and to assist in performing analysis in a selective manner on the data base to generate a statistical graphics output. DOE

N85-27159# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.
EARTH STATION ANTENNA SIDELOBE CHARACTERISTICS
J. M. Harman and R. D. Jennings Dec. 1984 55 p refs
(PB85-164986; NTIA-84-164) Avail: NTIS HC A04/MF A01 CSCL 09E

Measured analog data showing gain as a function of angle away from the mainbeam (maximum gain) axis have been obtained for 22 types of reflector antennas designed for operation at 4 GHz for reception and 6 GHz for transmission. The antennas ranged in size from 2.8 m to 13.0 m and represented six United States manufacturers. The analog patterns have been converted to sets of digital data pairs (gain and angle) to facilitate analysis. The data then have been analyzed following techniques recommended by the CCIR for antennas for earth stations in the Fixed-Satellite Service to develop statistical characterization of gain versus angle for the sidelobe regions. The digitization and analysis techniques are discussed and statistical results are provided, along with some background material from the perspectives of the CCIR, the FCC, and antenna manufacturers. GRA

N85-27024# Tohoku Univ., Sendai (Japan). Research Center for Applied Information.
PROPOSAL OF A METHOD FOR EVALUATING ACCURACY OF ESTIMATED IMPULSE RESPONSE OF A SYSTEM
Chun-Duck Kim (Busan Univ., Korea) and Keniti Kido *In its* The Record of Elec. and Comm. Eng. Conversazione, Vol. 53, No. 2, Nov. 1984 Nov. 1984 p 15-23 refs In JAPANESE; ENGLISH summary (For primary document see N85-27022 16-31)
Avail: NTIS HC A04/MF A01

N85-27048# Joint Publications Research Service, Arlington, Va.
ELECTRIC MOTORS WITH ELASTICALLY MOUNTED ROTORS Abstract Only
D. A. But and N. I. Kulikov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 27-28 Transl. into ENGLISH from Elektrichestvo (Moscow), no. 9, Sep. 1983 p 29-34 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27049# Joint Publications Research Service, Arlington, Va.
OPTIMAL CONTROL OF ELECTRIC DRIVE WITH SIMULTANEOUS CONTROL INPUTS FOR MOTOR CURRENT AND FLUX Abstract Only
V. I. Pansyuk *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 28 refs Transl. into ENGLISH from Elektrichestvo (Moscow), no. 9, Sep. 1983 p 35-38 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27096*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PHOTON DETECTION WITH COOLED AVALANCHE PHOTODIODES: THEORY AND PRELIMINARY EXPERIMENTAL RESULTS
D. L. Robinson and D. A. Hays *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 9-17 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09A

N85-27097*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TECHNIQUES FOR COMPUTING THE DFT USING THE RESIDUE FERMAT NUMBER SYSTEMS AND VLSI
T. K. Truong, J. J. Chang, I. S. Hsu (Univ. of Southern California), D. Y. Pei (Univ. of Southern California), and I. S. Reed (Univ. of Southern California) *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 18-30 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

N85-27102*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN INTEGRATED UNIX-BASED CAD SYSTEM FOR THE DESIGN AND TESTING OF CUSTOM VLSI CHIPS
L. J. Deutsch *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 51-62 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

N85-27103*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
HIGH-SPEED DIGITAL BASEBAND MIXER
F. P. Chan, M. P. Quirk, and R. F. Jurgens *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 63-80 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09A

N85-27104*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DIGITAL FILTERS FOR DIGITAL PHASE-LOCKED LOOPS
M. Simon and A. Mileant *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 81-93 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N85-27160 North Carolina State Univ., Raleigh.
LU METHODS FOR THE COMPRESSIBLE NAVIER-STOKES EQUATIONS Ph.D. Thesis
Robert Willis Walters 1984 126 p
Avail: Univ. Microfilms Order No. DA8500266

Some LU methods with emphasis on the strongly implicit procedure are examined and used to obtain numerical solutions of the compressible Navier-Stokes equations in conservative form. In order to gain insight into the applicability and relative efficiency of LU methods for hyperbolic and elliptic problems, the performance of various LU methods are compared with the delta form ADI scheme for some linear model problems. In contrast to the spatially split Douglas-Gunn type methods, the strongly implicit procedure is shown to be numerically stable for the three-dimensional wave equation. The method is applied to a variety of external and internal two-dimensional flow problems involving shock wave boundary-layer interaction for both laminar and turbulent flows. The results are in good agreement with other methods and/or experiments. The storage penalty associated with the method is discussed and a simple, yet effective, means of minimizing the problem is presented. Dissert. Abstr.

N85-27161 Illinois Univ., Urbana.
AN EXPERIMENTAL STUDY OF COMPRESSIBLE TURBULENT REATTACHING FREE SHEAR LAYERS Ph.D. Thesis
Mohammad Samimy 1984 224 p
Avail: Univ. Microfilms Order No. DA8502287

Compressible, two-dimensional, turbulent reattaching free shear layers formed by geometrical separation of a Mach 2.46 and a Mach 2.07 turbulent boundary layer flows over a backward-facing step were investigated. In the first set of experiments, the wind tunnel test section was specifically designed to obtain flow separation at the step without any flow expansion or compression. In the second set of experiments, the reattaching free shear layer in the classical backstep model was studied. A detailed survey of the flowfields was made utilizing a Schlieren system, static pressure probes, and a two-component coincident laser Doppler velocimeter. The expansion of the flow at the step produced stronger anisotropy and much higher turbulence level and shear stress. In the reattachment region, a significant increase in turbulence level, shear stress, and turbulent triple products were observed which is in sharp contrast to incompressible reattaching shear layers and is believed to be a fundamental difference. Extremely large shear stress, turbulent triple products, mixing length scale, and extremely enhanced mixing were observed in the redeveloping boundary layer. Dissert. Abstr.

N85-27162 Melbourne Univ., Carlton (Australia).
WAVE PROPAGATION IN DENSITY STRATIFIED FLUIDS Ph.D. Thesis
John Anthony Gear 1984 167 p
Avail: University Microfilms Order No. DA8429717

The fundamental properties of internal gravity are investigated with respect to the effect that the basic physical quantities of fluid velocity and buoyancy frequency have upon the propagation of these waves. Among other things, it is shown that when the wavenumber tends to infinity the wave phase speeds are then found to depend only upon the local behavior of the mean flow near an overall maximum or minimum of velocity. In shallow stratified fluids internal solitary waves are described to first order in wave amplitude, by the Korteweg-de Vries equation. This theory is extended to second order in wave amplitude. The second order correction to the wave profile and the phase speed and the first order correction to the wavelength are all determined. Strong interactions between weakly nonlinear long internal gravity wave modes are studied. Strong interactions occur when the linear long wave phase speeds are nearly equal although the waves belong to different modes. In shallow stratified fluids it is shown that this situation is described by two coupled Korteweg-de Vries equations. Dissert. Abstr.

N85-27163 Electricity Council, London (England).
THE USE OF HEAT PUMPS IN DISTRICT HEAT SUPPLY
H. P. Winkens 3 Apr. 1985 16 p refs Transl. into ENGLISH from Fernwaerme Intern. (West Germany), v. 13, no. 2, Mar. 1984 p 73-78
(BLL-OA-Trans-2728-(6196.3)) Avail: British Library Lending Div., Boston Spa, England

The cost elements of heat pump heat supply stations are examined and the optimum relationship between peak load boiler and heat pump output is shown. The dependence of plant size and temperature on heat generating costs is indicated and the costs of heat distribution and heat transfer are analysed. The possibility of a combined system of chop and heat pumps for the transport of heat over larger distances is shown. Author

N85-27164*# Analex Corp., Cleveland, Ohio.
COMPUTER PROGRAM FOR THE CALCULATION OF MULTI-COMPONENT CONVECTIVE DIFFUSION DEPOSITION RATES FROM CHEMICALLY FROZEN BOUNDARY LAYER THEORY Final Report
Sueleyman A. Goekoglu, Bor-Kuan Chen, and Daniel E. Rosner Washington Jan. 1984 35 p refs Prepared in cooperation with Yale Univ., New Haven, Conn.
(Contract NAS3-23293; Grant NAG3-201)
(NASA-CR-168329; E-1971; NAS 1.26:168329) Avail: NTIS HC A03/MF A01 CSCL 20D

The computer program based on multicomponent chemically frozen boundary layer (CFBL) theory for calculating vapor and/or small particle deposition rates is documented. A specific application

to perimter-averaged Na2SO4 deposition rate calculations on a cylindrical collector is demonstrated. The manual includes a typical program input and output for users. Author

N85-27165*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FLOW RATE AND PRESSURE PROFILES FOR 1 TO 4 AXIALLY ALINED ORIFICE INLETS
Robert C. Hendricks and T. Trent Stetz May 1985 44 p refs
(NASA-TP-2460; E-1980; NAS 1.60:2460) Avail: NTIS HC A03/MF A01 CSCL 20D

Choked flow rate and pressure profile data were taken on sequential axially alined inlets of the orifice type, with an orifice length-to-diameter ratio of 0.5. The configuration consisted of two to four inlets spaced at 0.66 and 32 orifice diameters apart. At a spacing of 32 diameters the reduced flow rate appeared to follow the simple power-law relation G(sub r)/G(sub r,1) = N (sup-b), where G(sub r,1) is the reduced flow rate for a single inlet, N is the number of inlets, and b, although temperature dependent, is approximately 0.4. At this spacing the instrumented orifices and spacers gave pressure profiles that dropped sharply at the entrance and partially recovered within each inlet, somewhat independent of N. At low inlet temperature jetting through the last orifice was common. At a spacing of 0.66 diameter fluid jetting through all N inlets was prevalent at low temperatures for each configuration studied, as indicated by the flat pressure profiles and flow rates that were nearly identical to those for a single orifice inlet. A simplifying relation was developed between the friction loss parameters for flow through N sequential tubes and N sequential inlets. The predicted flow rates for N tubes were in reasonable agreement with the N inlet analysis and followed the simple power-law relation. M.G.

N85-27166*# State Univ. of New York, Stony Brook. Dept. of Physics.
CONDUCTING A THERMAL CONDUCTIVITY SURVEY Final Report, 18 Oct. 1984 - 17 Jan. 1985
Philip B. Allen 17 Jan. 1985 32 p refs Sponsored by NASA Prepared for JPL
(NASA-CR-175792; JPL-9950-1088; NAS 1.26:175792) Avail: NTIS HC A03/MF A01 CSCL 20D

A physically transparent approximate theory of phonon decay rates is presented starting from a pair potential model of the interatomic forces in an insulator or semiconductor. The theory applies in the classical regime and relates the 3-phonon decay rate to the third derivative of the pair potential. Phonon dispersion relations do not need to be calculated, as sum rules relate all the needed quantities directly to the pair potential. The Brillouin zone averaged phonon lifetime turns out to involve a dimensionless measure of the anharmonicity multiplied by an effective density of states for 3-phonon decay. Results are given for rare gas and alkali halide crystals. For rare gases, the results are in good agreement with more elaborate perturbation calculations. Comparison to experimental data on phonon linewidths and thermal conductivity are made. Author

N85-27167*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
OBSERVATIONS, THEORETICAL IDEAS AND MODELING OF TURBULENT FLOWS: PAST, PRESENT AND FUTURE
Gary T. Chapman and Murray Tobak May 1985 41 p refs
(NASA-TM-86679; Rept-85072; NAS 1.15:86679) Avail: NTIS HC A03/MF A01 CSCL 20D

Turbulence was analyzed in a historical context featuring the interactions between observations, theoretical ideas, and modeling within three successive movements. These are identified as predominantly statistical, structural and deterministic. The statistical movement is criticized for its failure to deal with the structural elements observed in turbulent flows. The structural movement is criticized for its failure to embody observed structural elements within a formal theory. The deterministic movement is described as having the potential of overcoming these deficiencies by allowing structural elements to exhibit chaotic behavior that is nevertheless embodied within a theory. Four major ideas of this movement are described: bifurcation theory, strange attractors, fractals, and the renormalization group. A framework for the future study of turbulent flows is proposed, based on the premises of the deterministic movement. E.A.K.

N85-27168*# California Inst. of Tech., Pasadena.
FREE-SURFACE PHENOMENA UNDER LOW- AND ZERO-GRAVITY CONDITIONS Final Technical Report
Donald Coles 6 Jun. 1985 16 p refs
(Grant NAG3-466)
(NASA-CR-175835; NAS 1.26:175835) Avail: NTIS HC A02/MF A01 CSCL 20D

An apparatus to measure contact angle was constructed to exploit the proposed internal-corner criterion. If 2 alfa is the internal angle between two intersecting vertical planes and gamma is the contact angle, a meniscus at the corner rises to a finite height if alfa + gamma > pi/2 and to an infinite height if alfa + gamma < pi/2. The apparatus operates by decreasing the angle alfa from pi/2 until the meniscus height changes abruptly. A number of liquids are tested on glass and plexiglas. E.A.K.

N85-27169*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
VORTEX STUDIES RELATING TO BOUNDARY LAYER TURBULENCE AND NOISE
J. L. Adelman (George Washington Univ., Hampton, Va.) and J. C. Hardin 1985 5 p refs
(NASA-TM-87475; NAS 1.15:87475) Avail: NTIS HC A02/MF A01 CSCL 20D

The present study considers the two-dimensional case of an array of N rectilinear, like-sign vortices above an infinite flat boundary. The method of images can be employed with this configuration to reduce the problem to that of 2N vortices in free space, constrained by 2N symmetry relations. This system is Hamiltonian and therefore certain invariants of the motion are known. Futher, from the Hamiltonian constant, the equations of motion are readily derived and may be integrated numerically to determine the vortex trajectories. This knowledge of the time-dependent vortex motion then allows the resulting noise radiation to be computed by standard aeroacoustic techniques. R.J.F.

N85-27170# Nielsen Engineering and Research, Inc., Mountain View, Calif.
STUDIES OF STRUCTURE AND MODELING IN TURBULENT SHEAR FLOWS Final Report, 15 Jul. 1982 - 30 Sep. 1984
J. H. Ferzinger and O. J. McMillan Dec. 1984 61 p
(Contract N00014-82-C-0672)
(AD-A151807; NEAR-TR-335) Avail: NTIS HC A04/MF A01 CSCL 20/4

Several issues connected with turbulence and its modeling were studied using the results of full simulations of homogeneous turbulent flows. It was found that the mechanism of turbulence production in homogeneous sheared turbulence resembles the mechanism of the turbulence production in the mixing layer. It appears that it is possible to fit a wide range of shear flows, which have greatly different physical behavior, with a single turbulence model. A study of length scales used in turbulence modeling revealed that they are dependent on Reynolds number and the ratio of production to dissipation. Model parameters need to be different for each class of flow -- sheared turbulence, plane strain, and axisymmetric strain flows. A principal recommendation resulting from this study is that full turbulence simulations should be used when feasible for the purpose of studying both the physics of turbulence and turbulence modeling. Combination of simulation data with experimental data would be even more desirable. Development of new methods of investigating the data should be encouraged. GRA

N85-27171# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DYNAMIC RESPONSE OF FLUID TRANSMISSION LINES M.S. Thesis

P. G. Wilkins Dec. 1984 139 p
(AD-A151926; AFIT/GAE/AA/84D-28) Avail: NTIS HC A07/MF A01 CSCL 13/7

Experimental frequency response data were obtained for straight pneumatic transmission lines of circular cross-section. Three 24 in. long lines with inside diameters of 0.041, 0.119 and 0.195 in. were tested at Reynolds numbers varying from 0 to 15000. The experimental data were compared with theoretical predictions obtained from the distributed parameter, small signal equations for the blocked and laminar mean flow cases. Several models were used to predict the effects of turbulent mean flow. The prediction capability and limitations of two turbulent flow models, that include the effects of the Reynolds number, but not frequency, were investigated and discussed. Methods for determining the end impedance of open and orifice terminated lines with mean flow were studied. The relatively simple approach of reflection coefficients gave satisfactory results for both choked and unchoked flow in orifices. The radiation impedance associated with open lines was found to be negligible for all test cases. GRA

N85-27172# Yale Univ., New Haven, Conn. Dept. of Computer Science.
AN INCREMENTAL MULTIGRID STRATEGY FOR THE FLUID DYNAMICS EQUATIONS
M. Napolitano Jan. 1985 14 p
(Contract N00014-82-K-0184)
(AD-A151953; YALEU/DCS/RR-357) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper provides a novel incremental multigrid strategy for the equations of fluid dynamics. The (time dependent) governing equations are discretized in time by means of a two level implicit Euler scheme and linearized using Taylor series and the incremental (delta) form of Beam and Warming. The coefficients and the right hand side of the resulting linear systems are evaluated always at the finest grid level, whereas the (delta) unknowns are computed (approximately, by a single relaxation sweep) on a sequence of coarser meshes. At every grid level the computed deltas are interpolated up to the finest-grid level and used to update the solution, as well as the coefficients and the right hand side of the linear systems. This process is repeated, sweeping all grid levels successively, until a satisfactory convergence criterion is met. The validity of the proposed approach is demonstrated by solving a simple linear problem and the vorticity-stream function Navier-Stokes equations, using line relaxation methods as smoothers, and the lambda-formulation Euler equations, in conjunction with a simple explicit smoother. In all cases, the proposed multigrid strategy provides a considerable efficiency gain over the corresponding single-grid methods. GRA

N85-27173# Naval Postgraduate School, Monterey, Calif.
TWO-d HEAT TRANSFER THROUGH POROUS MEDIA WITH HEAT GENERATION M.S. Thesis
B. Martinez, Jr. Jun. 1984 135 p
(AD-A151965) Avail: NTIS HC A07/MF A01 CSCL 20/2

This thesis investigation develops an axisymmetric heat transfer-combustion model of a porous medium within a circular cylinder. System flow is governed by Darcy's law. Carbon and air properties are treated as variables of temperature. A combined continuity-Darcy equation, an oxygen mass balance equation, and energy balance equations (one each) for air and carbon, describe the conservation laws of the system. Transport mechanisms for oxygen mass transfer are molecular diffusion and convective transport, and an oxygen consumption term to account for combustion is included. Heat transfer mechanisms included in the model are conduction and convection. Radiation is accounted for at applicable boundaries only. Nonvolatile combustion is accounted for in the carbon energy and oxygen mass balance equations as a heat generation term of Arrhenius type. The numerical solution of four coupled, nonlinear, transient partial differential field equations is accomplished using the Galerkin formulation of the Finite Element Method. The effect of porosity of system behavior is examined. GRA

N85-27174# Systems Science and Software, La Jolla, Calif.
EQUATION OF STATE AND TWO-BODY CORRELATIONS FOR FLUIDS OF NON-SPHERICAL MOLECULES Final Report, 1 Nov. 1982 - 31 Dec. 1984
E. M. Waisman Jan. 1985 40 p Prepared in cooperation with Rutgers Univ.
(Contract F49620-83-C-0022; Grant AF-AFOSR-0016-82)
(AD-A151969; SSS-R-85-7095; AFOSR-85-0252TR) Avail: NTIS HC A03/MF A01 CSCL 07/4

This report is concerned with the progress made in obtaining the equation of state for fluid mixtures of non-spherical molecules beyond which is already in the previous annual report, SSS-R-84-6456, December 1983. Mixing rules and the medianization procedure were used for a CO2-C2H6 and other mixtures and found to give a very concise simple theory which is in good agreement with molecular dynamics. New mixing rules for spherical non-conformal potentials were obtained in the case of the exp-6. GRA

N85-27175# California State Univ., Northridge. Dept. of Geological Sciences.
INVERSION OF RAYLEIGH WAVE GROUP VELOCITIES FROM HIGH-EXPLOSIVE TESTS Final Report, Apr. 1982 - 31 Mar. 1983
G. W. Simila Jan. 1985 32 p
(Grant AF-AFOSR-0138-82)
(AD-A152172; AFOSR-85-0278TR) Avail: NTIS HC A03/MF A01 CSCL 19/1

Rayleigh-wave group-velocity have been obtained by the moving window analysis of high-explosive ground motion records at McCormick Ranch, Kirtland AFB. Fundamental mode velocities (225 to 264 m/s) were determined for the period range 50-160 ms at a recording distance of 229 m. Also, higher mode dispersion was observed for periods 25-60 ms with group velocities of 280 - 305 m/s. Possible spall phase dispersion was observed at distances of 11-36 m. Seismic refraction surveys provided initial model parameter for the test site. An iterative inversion method was used to estimate the shear velocity distribution. Constant layer thickness and attenuation values equal 50-100 were additional initial constraints. Inversion results yielded a shear-wave velocity model of 245-610 m/s to a depth of 24 m at McCormick Ranch. GRA

N85-27176# Naval Postgraduate School, Monterey, Calif.
FILMWISE CONDENSATION OF STEAM ON LOW INTEGRAL-FINNED TUBES M.S. Thesis
I. V. Georgiadis Sep. 1984 167 p
(AD-A152220; NPS-69-84-008) Avail: NTIS HC A08/MF A01 CSCL 13/1

Filmwise condensation heat-transfer measurements of steam were made on horizontal tubes under vacuum and near-atmospheric pressures. Data were taken for smooth tube and for 21 tubes which contained rectangularly-shaped, low integral fins. The fin geometry was systematically varied in order to investigate the dependence of the steam-side heat-transfer coefficient on fin spacing, thickness and height. The condensation process was found to be most sensitive to fin spacing and to be weakly dependent on fin thickness. When the fin height was increased from 1.0 to 2.0 mm, the increase in the heat-transfer coefficient was about 20 percent, while the increase in condensing area was 51 percent. The best performing finned tube had a fin height of 1.5 mm, a fin thickness of 1.0 mm and a fin height of 2.0 mm. It showed an enhancement over the smooth tube of between 4 to 5 under vacuum conditions and around 6 at atmospheric conditions. Thus, the use of finned tubes may result in a significant reduction in size and weight of present-day steam condensers. GRA

N85-27177# Rutgers - The State Univ., New Brunswick, N. J.
THEORETICAL INVESTIGATION OF THREE-DIMENSIONAL SHOCK WAVE TURBULENT BOUNDARY LAYER INTERACTIONS. PART 3 Annual Report, 1 Oct. 1983 - 30 Sep. 1984
D. D. Knight 12 Dec. 1984 52 p
(Grant AF-AFOSR-0040-82)

(AD-A152251; RU-TR-162-MIAE-F-Pt-3; AFOSR-85-0280TR-Pt-3) Avail:.NTIS HC A04/MF A01 CSCL 20/4

The focus of the research effort is the understanding of three-dimensional shock wave-turbulent boundary layer interactions. The approach uses the full mean compressible Navier-Stokes equations with turbulence incorporated through the algebraic turbulent eddy viscosity model of Baldwin and Lomax. This year's principle accomplishments are: (1) the Baldwin-Lomax model was evaluated for a series of non-separated two-dimensional turbulent boundary layers; (2) the 3-D Navier-Stokes codes was rewritten innto CYBER 200 FORTRAN; (3) the computed results for the 3-D sharp fin alpha sub g = 10 deg were compared with the results of a separate calculation by C. Horstmann using the k-epsilon turbulence model, and the experimental data of McClure and Dolling; and (4) the 3-D sharp fin at alpha sub g =20 deg was computed, and the results compared with the available experimental data. The examination of the flowfield structure of the 3-D sharp fin at alphaa sub g = 20 deg was initiated. GRA

N85-27178# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Mathematics.

SOLUTION OF ONSAGER'S EQUATION FOR A ROTATING COMPRESSIBLE FLUID IN A MULTIPLY-CONNECTED DOMAIN

M. D. Gunzburger, R. L. Wayland, III (Virginia Univ., Charlottesville), and H. G. Wood, III (Virginia Univ., Charlottesville) Jan. 1985 26 p refs

(Contracts DE-AC05-82OR-20900; DE-AC05-84OR-21400)
(DE85-007048; UVA-ER-970-85U) Avail: NTIS HC A03/MF A01

Onsager's model is extended to doubly connected regions, and the modified finite element solution algorithm is discussed. Several countercurrent flow yields are numerically simulated in the presence of a baffle. DOE

N85-27179# Los Alamos Scientific Lab., N. Mex.

SODIUM AND LITHIUM CORROSION IN MOLYBEDENUM HEAT PIPES

L. B. Lundberg and M. A. Merrigan 1984 11 p refs Presented at Phys. Met. and Technol. of Molybdenum and its alloys, Ann Arbor, Mich., 29 Oct. 1984

(Contract W-7405-eng-36)
(DE85-005561; LA-UR-84-4028; CONF-8410221-1) Avail: NTIS HC A02/MF A01

Sodium and lithium corrosion in molybdenum heat pipes was shown to be impurity dependent rather than solubility dependent. Impurities represent the major contributors to corrosion in the heat pipes tested. No evidence of direct solution of molybdenum by either sodium or lithium was shown. It is suggested that a critical concentration of impurities is required to initiate corrosion. It appears that corrosion in Mo/Na and Mo/Li heat pipes can be controlled if impurity concentration can be limited by removal of impurities from the working fluid and heat pipe components prior to operation or by internal gettering during operation. DOE

N85-27180# Rupert Insulation Projects, Inc., St. Paul, Minn.

DEVELOPMENT OF A POLYSTYRENE INSULATION SYSTEM Final Technical Progress Report

J. G. Rupert 20 Sep. 1984 60 p refs

(Contract DE-FG01-80CS-15027)
(DE85-006950; DOE/CS-15027/T1) Avail: NTIS HC A04/MF A01

An adhesive coating system for loose fill polystyrene materials was developed as a product primarily for retrofit insulation of residential buildings that would neither shrink nor settle. Several problems with the coated system including flammability and shrinkage led researchers to consider an an alternative system in which an expanded rock product called perlite was considered as an alternative to polystyrene. The primary problems with perlite are that it is very expensive and the coated structure is extremely brittle. A very attractive commercial market for retrofit insulation using either polystyrene beads or shredded polystyrene was identified. Specifically, it was demonstrated that commercial cement block buildings can be reinsulated by filling the cores of the cement blocks with a payback period of three years. With additional development, it appears that the payback period can be reduced to 2 years at present natural gas prices. The potential market for a commercial system of this kind was analyzed and determined to be on the order of ten billion dollars nationally. DOE

N85-27181# Sandia Labs., Albuquerque, N. Mex.

PYROTECHNIC SHOCK SIMULATION USING THE CONTROL RESPONSE OF A RESONATING BAR FIXTURE

N. T. Davie 1985 8 p refs Presented at the 31st Ann. Meeting of the Inst. of Environmental Sciences, Las Vegas, Nev., 29 Apr. 1985

(Contract DE-AC04-76DP-00789)
(DE85-006537; SAND-85-0118C; CONF-850450-2) Avail: NTIS HC A02/MF A01

Test laboratories frequently simulate pyrotechnic shock by mounting test items on various bar or plate fixtures which are excited into resonance by mechanical impact. A method for controlling the longitudinal response of a bar fixture is described. Masses clamped along the bar allow one to select which of the bar's natural frequencies will dominate its response upon impact. A test item mounted on one end of the bar thus experiences a controlled shock environment. This method ultimately provides a predictive means for controlling the shock spectrum shape produced by the simulated pyrotechnic shock. Control of the shock spectrum shape eliminates much of the trial and error usually required to tailor a shock test to satisfy the test requirement. A simple analytical model is described which derives the propagation and reflection of strain waves in the bar fixture. Bar responses predicted by this model agree with actual measurements. DOE

N85-27182# Institut Franco-Allemand de Recherches, St. Louis (France).

MEASUREMENTS OF TWO-PHASE EXHAUST FLOW PARAMETERS OF A SMALL CALIBER GUN ASSOCIATED WITH MUZZLE FLASH PHENOMENA

H. Mach 9 May 1983 25 p refs Presented at 7th Intern. Symp. on Ballistics, The Hague, 19-21 Apr. 1983

(ISL-CO-212/83) Avail: NTIS HC A02/MF A01

The muzzle exhaust flow of a 7.62 mm rifle was investigated to study the behavior of gas/particle flow within the highly underexpanded and the intermediate flash area using IR emission and absorption spectroscopy. The IR-spectrum is mainly determined by vibration-rotation bands of CO2 and H2O. Concentration, velocity, relaxation time and size distribution of the two-phase flow-borne particles were determined using light scattering methods, Doppler velocimetry and particle capturing techniques. It is found that particle sizes decrease with time. The particle density decreases concurrently with the increase of the CO2 concentration. Author (ESA)

N85-27183# Institut Franco-Allemand de Recherches, St. Louis (France).

SIMULATION OF INTERIOR BALLISTICS FLOWS IN A SHOCK TUBE [SIMULATION INNENBALLISTISCHER STROEMUNGEN IM STROSSROHR]

F. Seiler 18 Jul. 1983 30 p refs In GERMAN Presented at 1st Tagung des Arbeitskreises Rohrerosion, Bonn, 9-10 Jun. 1983

(ISL-CO-222/83) Avail: NTIS HC A03/MF A01

The flow in front of and behind a projectile was investigated in a interior ballistics shock tube simulator. Flow patterns and heat flow were examined for flows with and without gas leakage. The boundary layers behind the piston can clearly be shown by differential interferograms. The dependence of the heat flow into the measuring tube wall on the base form is smaller than the signal perturbations. Flow patterns show no appreciable effect of gas leakage on the flow behind the piston; strong flow effects arise in front of the piston. The same effects are shown by heat flow measurements. In case of gas leakage heat flows into the tube wall before the piston reaches the wall. In the slit between piston and wall a maximum heat flow is found. High temperature gradients, due to the fact that hot gases come closer to the tube wall than in the boundary layer flow behind the piston, lead to

high thermal loading of the wall materials which can cause cracks. Author (ESA)

N85-27184# Institut Franco-Allemand de Recherches, St. Louis (France).
STUDY OF THE COUPLING BETWEEN AVERAGE, COHERENT AND TURBULENT FIELDS IN A CIRCULAR EXCITED FREE JET Ph.D. Thesis [ETUDE DU COUPLAGE ENTRE CHAMPS MOYEN, COHERENT ET TURBULENT DANS UN JET, LIBRE ROND EXCITE]
J. Haertig 2 Jun. 1983 256 p refs In FRENCH
(ISL-R-115/83) Avail: NTIS HC A12/MF A01

Velocity field structures developed in a high Reynolds free jet were studied. An analytical solution to local linear instability problems is proposed. The nonlinear interactions of the fields is solved using the balance integral equations. The evolution of the average and unsteady values through the jet are thus determined. The turbulent and coherent fluctuations are separated by laser velocimeter measurements of axial and radial components and by using adequate signal processing. A mapping of the jet under various excitations is obtained. Author (ESA)

N85-27185# Institut Franco-Allemand de Recherches, St. Louis (France).
COMPUTATION MODEL OF TURBULENT FREE FLOW: APPLICATION TO AXISYMMETRIC JETS [MODELE DE CALCUL DES ECOULEMENTS LIBRES TURBULENTS: APPLICATION AU JET AXISYMETRIQUE]
L. Bobin and G. Kronenberger 12 Oct. 1983 37 p refs In FRENCH
(ISL-R-126/83) Avail: NTIS HC A03/MF A01

A numerical computation program to study turbulent flows, free, axisymmetric or two-dimensional was developed. The program, tested with hyperbolic jet profiles, gives good results. Near the jet outlet, where the gradients are large, the numerical method is not accurate enough. Author (ESA)

N85-27186# Karlsruhe Univ. (West Germany). Sonderforschungsbereich 210.
EXPERIMENTAL INVESTIGATIONS OF PRISMATIC CYLINDERS IN FLOW WITH HARMONIC PULSATIONS
C. Knisely, M. Matsumoto, and F. Menacher Nov. 1984 110 p refs
(KU-SFB-210/E/4) Avail: NTIS HC A06/MF A01

The effect of small amplitude harmonic flow pulsations on the wake development behind prismatic cylinders were examined by making mean and fluctuating pressure measurements in a wind tunnel and by employing hydrogen bubble flow visualization in a water channel. Configurations with slenderness ratios (streamwise body dimension/transverse body dimension) of 0.5 and 2.0, were used. For the 0.5 body and with pulsation amplitudes of the order of 1% of free stream velocity, the mean base pressure decreases by up to 20% compared with its value in steady flow. For the 2.0 body the perturbations have no significant effect of the mean base pressure. For the 0.5 body, the decrease in base pressure with forcing at 4 times the natural shedding frequency disappears for all 3D cases, while the magnitude of the decrease for forcing at twice the natural shedding frequency depends on aspect ratio. Author (ESA)

N85-27187# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
AN EXPERIMENTAL INVESTIGATION OF THE INTERACTION BETWEEN A SHOCK WAVE AND A TURBULENT BOUNDARY LAYER ON A CONVEX WALL
C. Nebbeling May 1984 34 p refs
(VTH-LR-428) Avail: NTIS HC A03/MF A01

The interaction between a shock wave and a turbulent boundary layer on the convex wall of a curved wind tunnel was investigated for a radius of curvature, boundary layer thickness, and Mach number such that a closed separated region near the shock wave was obtained. Mach number just upstream of the shock wave 1.43. The thickness of the undisturbed turbulent boundary layer was 6.2 mm and the Reynolds number related to this boundary layer thickness was 200,000. Mach number, velocity distributions, the boundary layer integral parameters, and the skin-friction coefficients were deduced from flow field measurements. The length of the separated region, related to the undisturbed boundary layer thickness, is smaller than usually found on a plane wall. The influence of wall curvature on the boundary layer integral parameters appears from comparison with results from plane wall shock wave-boundary layer interactions. Author (ESA)

N85-27188# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
THE DEVELOPMENT OF A COMPUTATIONAL MODEL FOR A TWO-DIMENSIONAL TURBULENT FLOW. PART 1: MATHEMATICAL BACKGROUND
J. B. Vos Jan. 1984 70 p refs Prepared in cooperation with Prins Maurits Lab.
(Contracts STW-DRL11.0120; PBE-90753.140)
(VTH-LR-436-Pt-1; PML-1984-C52-Pt-1) Avail: NTIS HC A04/MF A01

Equations describing three-dimensional time dependent turbulent flow with chemical reactions are simplified to describe two-dimensional steady turbulent flow without chemical reactions. The partial differential equations describing this flow are integrated over a control volume to obtain algebraic finite difference equations. These equations, together with their initial and boundary conditions, are solved by iteration. Information about the equations to be used in a computional model of flow within a solid fuel combustion chamber is given. Author (ESA)

N85-26612# Tokyo Univ. (Japan). Inst. of Space and Astronautical Science.
PROGRESS OF COMPUTATIONAL FLUID DYNAMICS IN THE WORLD
Koichi Oshima *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 1-6 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26616# Tokyo Univ. (Japan). Inst. of Space and Astronautical Sciences.
SOME NUMERICAL ANALYSES OF FLOWS WITH SEPARATION
Kunio Kuwahara *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 37-42 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26617# Tohoku Univ., Sendai (Japan).
TWO COMPUTATIONAL METHODS FOR CASCADE FLOWS
Hisaaki Daiguji *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 43-53 refs In JAPANESE (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26619# National Aerospace Lab., Tokyo (Japan).
NUMERICAL SIMULATION OF INVISCID COMPRESSIBLE FLOW THROUGH THREE-DIMENSIONAL CASCADE
Masahiro Fukuda *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 63-70 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26620# National Aerospace Lab., Tokyo (Japan).
A NUMERICAL PROCEDURE ON THREE-DIMENSIONAL PARABOLIC FLOW IN DUCT
Atsuhiro Tamura and Kazuo Kikuchi *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 71-81 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26629# Kawasaki Heavy Industries, Ltd., Akashi (Japan).
THE ROLE OF COMPUTATIONAL FLUID DYNAMICS IN AERONAUTICAL ENGINEERING
Jun Okumura, Tadamasa Jyonouchi, and Keisuke Sawada *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 169-186 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26897*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FLUID AND GAS DYNAMICS Abstract Only
L. Povinelli (NASA. Lewis Research Center) and H. Struck *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 508-510 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20D

N85-26902*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYTICAL STUDY OF FLOW PHENOMENA IN SSME TURNAROUND DUCT GEOMETRIES
Kerry L. McLallin *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 579-598 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20D

N85-27056# Joint Publications Research Service, Arlington, Va.
APPROXIMATE SOLUTION OF THE PROBLEM OF FLUID OSCILLATIONS IN CAVITIES OF REVOLUTION Abstract Only
V. L. Shetukhin and V. P. Shmakov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 50 Transl. into ENGLISH from Prikl. Mekh. (Kiev, USSR), no. 9, Sep. 1983 p 91-95 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27057# Joint Publications Research Service, Arlington, Va.
TURBULENT FLOW OF FLUID NEAR TRAILING EDGE OF PLATE IN STREAM AT ZERO ANGLE OF ATTACK
S. A. Velichko and Yu. B. Lifshits *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 51 Transl. into ENGLISH from Izv. Akad. Nauk, Mekh. Zhidkosti i Gaza (Moscow), no. 6, Jun. 1983 p 17-23 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27058# Joint Publications Research Service, Arlington, Va.
OPTIMUM GEOMETRY OF INTERBLADE PASSAGES IN IMPELLERS OF THERMOMOLECULAR VACUUM PUMP Abstract Only
K. Ye. Demikov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 51-52 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Mashinostr. (Moscow), no. 12, Dec. 1983 p 66-69 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27062# Joint Publications Research Service, Arlington, Va.
AERODYNAMIC FORCES DEVELOPING IN CHANNELS BETWEEN VASES IN TURBINE DRIVE WHEELS Abstract Only
In its USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1985 p 55 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Energetika (Minsk, USSR), no. 9, Sep. 1983 p 79-83 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27064# Joint Publications Research Service, Arlington, Va.
BOUNDARY LAYER AT MOVING CYLINDER SURFACE Abstract Only
V. M. Zubarev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 56 Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Mekh. Zhidkosti i Gaza (Moscow), no. 6, Jun. 1983 p 38-42 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N85-27189 Arizona Univ., Tucson.
INFRARED PRESENSITIZATION PHOTOGRAPHY Ph.D. Thesis
Joseph Martin Geary 1984 190 p
Avail: University Microfilms Order No. DA8500462

Infrared presensitization photography (IRPP) is a double exposure technique that allows the recording of IR information on standard silver halide films not ordinarily sensitive in this long wavelength regime. This dissertation prescribes conditions for the practical implementation of the IRPP process in data collection. The study is divided into experimental and theoretical portions, with much heavier emphasis on the former. Experiments delve into the behavior of the characteristic and spectral sensitivity curves of film within the context of the IRPP phenomenon. The temperature rise experieced by the film during this process is determined. The influence of sensitizing dyes and ionic population increases in the grain crystals is also explored. Theoretical efforts concentrate on an extension of the Shaw photographic model to explain the IRPP effect in terms of a down-shifting in the overall quantum sensitivity requirements of the grain population.
Dissert. Abstr.

N85-27190 United Kingdom Atomic Energy Authority, Dounreay (Scotland).
EQUIPMENT FOR MONITORING LOW CONCENTRATIONS OF VOLATILE SUBSTANCES IN GASES OR LIQUID METALS
S. Matousek, A. Kral, J. Kovar, and O. Pitak 7 May 1985 14 p Transl. into ENGLISH of Czechoslovakian Patent No. 183997, 15 Sep. 1977
(BLL-Dounreay-Tr-949-(9091.9F)) Avail: British Library Lending Div., Boston Spa, England

Equipment for rapid and highly sensitive monitoring of low concentrations of volatile substances in gases is described. With additions the equipment may be used for rapid monitoring of the activity of carbon in liquid metals and their alloys, particularly sodium in heat-exchange circuits of nuclear power stations. Knowledge of the concentration of harmful impurities in the air contributes to the task of preventing pollution of the environment. Knowledge of the total concentration of hydrocarbons, hydrogen and nitrogen in shielding gas in sodium heat-exchange circuits and the carbon activity in the sodium in these circuits contributes to the task of ensuring the safe operation of nuclear power stations, particularly those based on fast reactors.
Author

N85-27191 Department of the Navy, Washington, D. C.
PHASE-LOCK FIBER OPTIC INTERFEROMETER Patent
I. J. Bush, inventor (to Navy) Issued 4 Dec. 1984 9 p Supersedes AD-D009678
(AD-D011603; US-Patent-4,486,657; US-Patent-Appl-SN-382850; US-Patent-Class-250-227) Avail: US Patent and Trademark Office CSCL 20/6

A fiber optic acoustic sensing system for tracking a phase shift linearly over a wide range thereby allowing accurate tracking in the presence of temperature induced phase fluctuation is described. In one embodiment, light from a laser is split and coupled into both legs of a fiber interferometer. One leg is phase modulated by the acoustic signal while the other leg is phase modulated by a first and second piezoelectric cylindrical modulators. The second modulator is driven at omega sub m to effectively shift the acoustic information up in frequency into the sidebands of the carrier omega sub m. The light signals in the two legs are combined, detected, cross-correlated with the carrier omega sub m to produce an error signal, and then low pass filtered. This filtered error signal is fed

back to control the first modulator. The first modulator keeps the interferometer locked in phase by effectively cancelling out the phase produced by temperature and acoustic pressure fluctuations. To effect this cancellation, the first modulator must inversely duplicate the phase shift thereby producing the desired output signal. GRA

N85-27192 Department of the Navy, Washington, D. C.
POLARIMETRIC IMAGE RECORDER Patent
I. Schneider and C. S. Guenzer, inventors (to Navy) Issued 25 Dec. 1984 8 p Supersedes AD-D009709
(AD-D011605; US-Patent-4,490,016; US-Patent-Appl-SN-395431; US-Patent-Class-350-397) Avail: US Patent and Trademark Office CSCL 20/6

This patent discloses a polarimetric image recorder which records only the net polarization of the viewed scene. An optical lens system projects the light originating from the viewed scene onto a thin layer of an alkali halide crystal containing anisotropic color centers. Polarized light reorients the color centers and creates a net polarization in the layer. The net polarization of the layer is read by such means as shining polarized light through the layer and then through a polarizer set perpendicularly to the polarization of the light source. Whatever light is viewed through the reader represents a net polarization in the scene. GRA

N85-27193*# Bendix Aerospace Systems Div., Mishawaka, Ind. Guidance Systems Div.
HARDWARE TEST PROGRAM FOR EVALUATION OF BASELINE RANGE-RANGE RATE SENSOR CONCEPT Monthly Progress Report, 12 Apr. - 11 May 1985
11 May 1985 10 p
(Contract NAS8-36144)
(NASA-CR-175794; NAS 1.26:175794) Avail: NTIS HC A02/MF A01 CSCL 14B

The baseline range/range rate sensor concept was evaluated. The Interrupted CW (ICW) mode of operation continued with emphasis on establishing the sensitivity of the video portion of the receiver was 7 dB less than the theoretical value. This departs from test results of previous implementations in which achieved sensitivity was within 1.5 to 2 dB of the theoretical value. Several potential causes of this discrepancy in performance were identified and are scheduled for further investigation. Results indicate that a cost savings in both per unit and program costs are realizable by eliminating one of the modes of operation. An acquisition (total program) cost savings of approximately 10% is projected by eliminating the CW mode of operation. The modified R/R sensor would operate in the ICW mode only and would provide coverage from initial acquisition at 12 nmi to within a few hundred feet of the OMV. If the ICW mode only were selected, then an accompanying sensor would be required to provide coverage from a few hundred feet to docking. B.G.

N85-27194# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
INPE'S LINE IMAGING CAMERA: PRELIMINARY RESULTS
Roberto Pereira daCunha, Marcus A. A. Siqueira, Antonio LopesFilho, Govindaraju K. Rayalu, Jose Dias Mattos, and Paolo P. G. Camilli Mar. 1985 12 p refs Presented at the 4th SELPER Meeting, Santiago de Chile, Nov. 1984
(INPE-3476-PRE/719) Avail: NTIS HC A02/MF A01

INPE has been working in the development of a pushbroom type of sensor. The first prototype of INPE's pushbroom camera includes a commercial type optical system (Hasselblad lens) and a 1728-element CCD array (Fairchild CCD 122). In a preliminary evaluation, data acquired in the first flight was converted to digital form in order obtain both CCTs and film products for qualitative and quantitative analysis. A three bar ground target was used to study the geometric characteristics of the sensor system as compared to those of conventional aerial photographs, taken simultaneously during the same test flight. Analysis of the first results have shown that: (1) The sensor system met most of the specified characteristics for a prototype. (2) Aircraft (e.g., yaw) and image (e.g., smearing) motions contributed to the major geometric distortions. (3) Particularly, bright targets tended to show an enhanced effort of line to line misregistration (line to line shifts were mainly due to the lack of synchronization during the A/D conversion process). (4) Although a preset geometric resolution of 76cm (3000m - overflight) was not obtained, objects at small as 30cm wide were, radiometrically, resolved. Author

N85-27195# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE BRESEX MULTISPECTRAL CAMERA: PRELIMINARY CHARACTERISTICS
Marcus Antonius Andrade Siqueira, Ronald Ranvaud, Amauri Silva Montes, Antonio LopesFilho, Govindaraju Krishna Rayalu, Jose Dias deMatos, and Paolo Pio Gabriele Camilli Feb. 1985 9 p Presented at the 4th Ann. Meeting of SELPER, Santiago de Chile, 12-16 Nov. 1984
(INPE-3424-PRE/687) Avail: NTIS HC A02/MF A01

A Multispectral Camera is described which will be inegrated into the Brazilian Remote Sensing Experiment (BRESEX). It is envisaged to fly this camera on board the Space Shuttle in the first half of 1987. This camera will have three spectral bands in the visible and near-infrared and a ground resolution of 20 meters for a flight altitude of 300 kilometers. It will use pushbroom imaging technology with silicon Charge-Coupled Device (CCD) linear arrays as sensors. Author

N85-27196# Institut Franco-Allemand de Recherches, St. Louis (France).
THE UTILIZATION OF OPTICAL FIBERS IN HOLOGRAPHY [UTILISATION DES FIBRES OPTIQUES EN HOLOGRAPHIE]
F. Albe 5 Jan. 1983 33 p refs In FRENCH
(ISL-R-102/83) Avail: NTIS HC A03/MF A01

The utilization of optical fibers to obtain holograms of objects which are of difficult access is described. The choice of monomode or multimode fibers and the influence of the environment on the stability of the interference fringes are discussed. Several configurations of the holographic system are examined. The holograms of a vibrating plate showing the effects of all the variables studied are presented. Author (ESA)

N85-27197# Aeronautical Research Labs., Melbourne (Australia).
A STRAIN GAUGE MANUAL
S. W. Gee and L. Conder Apr. 1984 238 p
(AD-A151802; ARL/STRUC-TM-378) Avail: NTIS HC A11/MF A01 CSCL 14/2

The electrical resistance strain gauge is a very reliable sensor, much used in structural and mechanical testing. This document has been prepared to assist the inexperienced technician in selecting and using these gauges. General recommendations are made regarding gauge types, adhesives, proffing materials and gauge techniques for a variety of environmental conditions. GRA

N85-27198# Aerodyne Research, Inc., Billerica, Mass.
HOLOSWITCH, PHASE 1 Interim Technical Report
H. J. Caulfield Feb. 1985 4 p
(Contract N00014-84-C-0727)
(AD-A152212; ARI-RP-203) Avail: NTIS HC A02/MF A01 CSCL 20/6

The purpose of this Phase I SBIR contract is to develop ways of using switchable holograms to change from one optical interconnect pattern to another with great rapidity. That is we sought to combine the high flexibility in design and high diffraction efficiency of classical holography with the reprogrammability of the far-less-efficient real time holographic methods of four wave mixing, three wave mixing, etc. We are considering three distinct ways to switch holograms. In one approach, the hologram itself is multistable. Multistable holograms can include a very useful state of no diffraction. Therefore they can be arrayed in such a way that, if they are inactive, the light passes through them to the next hologram. The second approach is to use fixed holograms which are active for one polarization state and inactive for the other. Electro-optic switches control which one operates. Third,

we can use a 90 deg hologram through which only light polarized in the plane of the hologram can diffract. GRA

N85-27199# Naval Postgraduate School, Monterey, Calif.
DESIGN AND CONSTRUCTION OF A COMPUTER CONTROLLED MICROTHERMOCOUPLE PROBE FOR THE STUDY OF BUOYANT JETS M.S. Thesis
R. J. Matoushek Sep. 1984 111 p
(AD-A152224) Avail: NTIS HC A06/MF A01 CSCL 09/2

A computer-aided data acquisition system was developed and a microthermocouple probe constructed to obtain thermal distributions in turbulent buoyant jets exposed to a cross-flowing ambient fluid. The system performed high speed temperature measurements as a microthermocouple probe was automatically traversed through a sequence of a preprogrammed postiions under the control of a microcomputer. Operability of the apparatus was demonstrated by measuring temperature distributions in planes perpendicular to the streamwise aixs of jets from which contour plots of temperature were generated. Using temperature distributions along with velocity distributions allow buoyant jet characteristics to be computed, including the entrainment rate of ambient fluid, jet trajectory, and heat transfer to the ambient. The experimental technique is discussed and temperature contour plots for a jet at various planes are presented. Author (GRA)

N85-27200# Sandia Labs., Albuquerque, N. Mex. Image Processing Facility.
DIGITAL IMAGE ANALYSIS OF FOUR-FRAME HOLOGRAPHIC PLASMA AND NEUTRAL GAS INTERFEROGRAMS
Gary A. Mastin and Gary R. Allen Jan. 1985 14 p refs
(Contract DE-AC04-76DP-00789)
(DE85-008397; SAND-84-2124) Avail: NTIS HC A02/MF A01

Diagnostic interferograms characterizing the dynamics of plasma and neutral in the anode-cathode gap of magnetically insulated transmission lines (MITL) are well suited for digital image analysis. The presence of plasma or a neutral gas near the cathode surface produces bending of a pattern of background fringes on the interferogram; the fringes would be straight and uniformly spaced in the absence of such a perturbation. Because the fringes are periodic, a Fast Fourier Transform (FFT) can be performed and the phase of the dominant spatial frequency component of the fringe pattern extracted. The fringe phase shift is proportional to the plasma electron or neutral gas density. Futhermore, the location of the plasma-cathode interface can be estimated from the interferogram so that electron density as a function of distance from the cathode surface can be computed. The technical problem is introduced. The image analysis algorithm examined and diagnostic interferogram analysis results presented. The ability to reliably extract and estimate quantitative parameters from interferograms via digital image analysis is emphasized. DOE

N85-27201# Oak Ridge National Lab., Tenn.
NEW FOCAL PLANE DETECTOR SYSTEM FOR THE BROAD RANGE SPECTROMETER
T. P. Sjoreen 1984 16 p refs Presented at the Instrumentation for Heavy Ion Nucl. Res. Conf., Oak Ridge, Tenn., 22 Oct. 1984
(Contract DE-AC05-84OR-21400)
(DE85-005370; CONF-841005-5) Avail: NTIS HC A02/MF A01

A focal plane detector system consisting of a vertical drift chamber, parallel plate avalanche counters, and an ionization chamber with segmented anodes was installed in the Broad Range Spectrometer at the Holifield Facility at Oak Ridge. The system, which was designed for use with light heavy ions with energies ranging from 10 to 25 MeV/amu, has a position resolution of approx. 0.1 mm, a scattering angle resolution of approx. 3 mrad, and a mass resolution of approx. 1/60. DOE

N85-27202# Los Alamos Scientific Lab., N. Mex.
MANAGEMENT OF VACUUM LEAK-DETECTION PROCESSES, STANDARDS AND CALIBRATION
N. G. Wilson 1984 18 p refs Presented at 31th Natl. Vacuum Symp., Reno, Nev., 3 Dec. 1984
(Contract W-7405-eng-36)
(DE85-006705; LA-UR-85-294; CONF-841218-22) Avail: NTIS HC A02/MF A01

Vacuum leak detection requires integrated management action to ensure the successful production of apparatus with required leak tightness. Implementation of properly planned, scheduled, and engineering procedures and test arrangements are a necessity to prevent unexpected, impractical, technically inadequate, or unnecessarily costly incidents in leak testing operations. The use of standard procedures, leak standards appropriate to the task, and accurate calibration systems or devices is necessary to validate the integrity of any leak test procedure. The need for implementing these practices is discussed using case histories of typical examples of large complex vacuum systems. Aggressive management practices are of primary importance throughout a project's life cycle to ensure the lowest cost; this includes successful leak testing of components. DOE

N85-27203# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
CRYOSTAT AND ELECTRONIC DEVELOPMENT ASSOCIATED WITH MULTI-DETECTOR SPECTROMETER SYSTEMS
R. H. Pehl, N. W. Madden, D. A. Landis, D. F. Malone, and C. P. Cork Oct. 1984 9 p refs Presented at the Nucl. Sci. Symp., Orlando, Fla., 31 Oct. 2 Nov. 1984 Sponsored in part by National Cancer Inst. Submitted for publication
(Contract DE-AC03-76SF-00098)
(DE85-007624; LBL-17872; CONF-841007-59) Avail: NTIS HC A02/MF A01

To overcome the problems of fabricating a practical cryostat that contains a large number of semiconductor detectors and the electronics associated with a high resolution spectrometer system has required a number of significant technological developments. These problems and the corresponding solutions are presented. DOE

N85-27204# Institut Franco-Allemand de Recherches, St. Louis (France).
ULTRAFAST HOLOGRAPHY USING OPTICAL FIBERS [HOLOGRAPHIE ULTRA-RAPIDE PAR FIBRES OPTIQUES]
E. Albe 21 Dec. 1983 20 p refs In FRENCH; ENGLISH summary Presented at Congr. on Horizons de l'Opt. 83, Bordeaux, 21-23 Nov. 1983
(ISL-CO-238/83) Avail: NTIS HC A02/MF A01

The vibration modes of a metallic plate were studied via holography using monomode fibers, a continuous wave laser, and a thermoplastic camera, to help develop a 20 nsec impulsion laser holographic endoscope. The choice of the fibers and the configuration of the holographic set-up are discussed. The holograms obtained are presented. Author (ESA)

N85-26647# Litton Guidance and Control Systems, Woodland Hills, Calif.
LASER GYROSCOPE RANDOM WALK DETERMINATION USING A FAST FILTERING TECHNIQUE
John G. Mark and Alison Brown *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 17 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26660# Technische Univ., Brunswick (West Germany).
THE USE OF PRESSURE SENSING TAPS ON THE AIRCRAFT WING AS SENSOR FOR FLIGHT CONTROL SYSTEMS
Dirk Brunner *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 8 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26819# Joint Publications Research Service, Arlington, Va.
SVIT COMPLEX FOR ANALYSIS OF SPACE PHOTOGRAPHY
Ye. Nelepo *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 78-79 Transl. into ENGLISH from Mosk. Komsomolets (Moscow), 15 Jan. 1985 p 4 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26903*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INSTRUMENTATION TECHNOLOGY OVERVIEW Abstract Only
W. C. Nieberding *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 599-602 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

N85-26904*# United Technologies Research Center, East Hartford, Conn.
FIBER OPTIC RAMAN THERMOMETER FOR SPACE SHUTTLE MAIN ENGINE PREBURNER PROFILING
John A. Shirley *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 603-617 refs (For primary document see N85-26862 16-20)
(Contract NAS8-34655)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

N85-26905*# Honeywell, Inc., Minneapolis, Minn. Solid State Electronic Div.
AN ADVANCED SOLID STATE PRESSURE TRANSDUCER FOR HIGH RELIABILITY SSME APPLICATION
R. L. Johnson and D. B. Wamstad *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 618-638 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

N85-26906*# National Bureau of Standards, Boulder, Colo. Chemical Engineering Science Div.
VORTEX SHEDDING FLOWMETERS FOR LIQUIDS AT HIGH FLOW VELOCITIES
J. D. Siegwarth *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 639-653 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

N85-26908*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.
NONINTRUSIVE SHAFT SPEED SENSOR
S. Barkhoudarian, L. Wyett, and J. Maram *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 674-693 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14B

N85-27050# Joint Publications Research Service, Arlington, Va.
ESTIMATES OF ERRORS OF A GYROSCOPE STABILIZED PLATFORM Abstract Only
A. V. Zbrutskiy and I. V. Balabanov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 41 Transl. into English from Prikladnaya Mekhan. (Kiev), no. 9, Sep. 1983 p 125-128 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27051# Joint Publications Research Service, Arlington, Va.
ERRORS IN COMPENSATING FOR IMAGE OSCILLATION BY MEANS OF A GYROSCOPIC HEAD Abstract Only
A. V. Torochkov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 42 Transl. into ENGLISH from Tekh. Kino i Televideniya (Moscow), no. 12, Dec. 1983 p 22-24 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27052# Joint Publications Research Service, Arlington, Va.
HOLOGRAPHIC LENS FOR OPTICAL CORRELATOR Abstract Only
G. B. Semenov, S. N. Koreshev, A. V. Pavlov, and Ye. I. Shubnikov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 46-47 Transl. into ENGLISH from Opt. i Spektrosk. (Lenningrad), v. 55, no. 5, Nov. 1983 p 945-949 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27055# Joint Publications Research Service, Arlington, Va.
OPERATION OF AUTOTRACKING SYSTEM IN VARIOUS VIDEO PLAYBACK MODES Abstract Only
V. G. Soshnikov, G. V. Fridlyand, and L. V. Fridlyand *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 49 refs Transl. into ENGLISH from Tekh. Kino i Televideniya (Moscow), no. 12, Dec. 1983 p 43-47 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27418*# Harvard Univ., Cambridge, Mass.
RESEARCH AND DEVELOPMENT OF NEW INSTRUMENTS Final Report
In its Meas. of Elements in the Stratosphere 1985 p 96-172 (For primary document see N85-27414 16-46)
Avail: NTIS HC A16/MF A01 CSCL 14B

N85-27732 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
MODULAR OPTOELECTRONIC MULTISPECTRAL SCANNER (MOMS) FOR EARTH OBSERVATION. FIRST RESULTS OF STS-7 MISSION
D. Meissner, H. Laucht, J. Bodechtel (Technische Univ., Munich), and R. Haydn (Technische Univ., Munich) *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 221-236 refs Presented at Joint Intern. Geosci. and Remote Sensing Symp. (IGARSS 83), San Francisco, 31 Aug. - 2 Sep. 1983 Sponsored by Bundesministerium fuer Forschung und Technologie and DFVLR (For primary document see N85-27724 16-81)
(MBB-UR-717/83-O) Avail: Issuing Activity

36 LASERS AND MASERS

Includes parametric amplifiers.

N85-27205 California Univ., Davis.
A STUDY OF MODE-LOCKED ARGON ION-DYE LASER SYSTEMS Ph.D. Thesis
Richard Harnett Selfridge 1984 149 p
Avail: University Microfilms Order No. DA8501782

A new argon ion dye laser double mode locking cavity is presented that allows simultaneous pulse period variation in both laser pulse trains. The predicted number of pulses are analyzed and hence the period of pulses for different cavity length adjustments. A novel approach to creating synchronous picosecond pulse trains at two wavelengths is presented. The method uses a synchronously pumped argon ion laser to cause population inversion and lasing in a mixture of rhodamine 6G and cresyl violet dye. This synchronously pumped double mode locking is simpler to implement than other two wavelength methods. The pulses produced are superior to those generated in the widely used commercial synchronously pumped systems. Dissert. Abstr.

N85-27206*# Old Dominion Univ., Norfolk, Va. Dept. of Physics.
THEORETICAL STUDIES OF SOLAR-PUMPED LASERS Progress Report, 16 Jul. 1984 - 15 Jan. 1985
Wynford L. Harries and Zeng-Shevan Fong Jan. 1985 4 p refs (Grant NsG-1568)
(NASA-CR-175801; NAS 1.26:175801; TR-PTR-85-2) Avail: NTIS HC A02/MF A01 CSCL 20E

The power output of a black body solar-pumped laser as a function of time (computer graphic solutions) and under steady state conditions (analytic conditions); computer analyses of polymerization using lasers; and metallic sodium as a laser medium were studied. B.G.

N85-27207*# Florida Univ., Gainesville. Quantum Theory Project.
IDENTIFICATION AND PROPERTIES OF MOLECULAR SYSTEMS OF POTENTIAL USE IN SOLAR-PUMPED LASERS Final Technical Report, 1 May 1981 - 31 Aug. 1984

David A. Micha and N. Yngve Oehrn 31 Jan. 1985 25 p refs (Grant NAG1-176)
(NASA-CR-175804; NAS 1.26:175804) Avail: NTIS HC A02/MF A01 CSCL 20E

The concepts and computational tools of theortical chemistry are used to investigate molecular properties needed in direct solar-pumped lasers. Compounds of the type RR'CXY, with R and R' organic groups, and X and Y halide atoms were identified as likely candidates because of their highly enhanced absorption coefficients over compounds with a single halide atom. The use of a combination of vibrational excitation followed by electronic excitation to enhance quantum yields at certain wavelengths is indicated. A self-consistent eikonal approximation to state-to-state transitions was tested for CH3I and is useful for other problems involving electronic energy and charge transfer. An approach to calculate potential energy surfaces and transition dipoles was developed which is based on the generation of eigenstates of the nonrelativisitc Hamiltonian followed by incorporation of the spin-orbit coupling by configuration interaction. A.R.H.

N85-27208# Oklahoma State Univ., Stillwater. Dept. of Physics.
SPECTROSCOPIC INVESTIGATION OF MATERIALS FOR FREQUENCY AGILE LASER SYSTEMS Final Report, 15 Jan. 1982 - 14 Jan. 1985
R. C. Powell Jan. 1985 141 p
(Contract DAAG29-82-K-0041)
(AD-A151731; ARO-18677.11-PH) Avail: NTIS HC A07/MF A01 CSCL 20/5

This research involves the use of laser spectroscopy techniques such as four-wave mixing, multiphoton absorption, time-resolved site-selection spectroscopy, and holography to characterize dynamical optical processes such as energy transfer, exciton migration, radiation less relaxation, and the photorefractive effect. In addition, a significant effort was spent in the synthesis and characterization of new types of materials for tunable laser applications. The materials investigated include alexandrite, titanium doped sapphire, lithium niobate, neodymium pentaphosphate, rhodium doped rubidium calcium fluoride, manganese silicate, and neodymium doped garnet crystals and glasses. Author (GRA)

N85-27209# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPUTER MODELING OF VIBRATIONAL ENERGY LEVELS OF POTENTIAL LASER CANDIDATES (DIATOMIC MOLECULES) M.S. Thesis
P. H. Ostdiek Dec. 1984 198 p
(AD-A151765; AFIT/GEP/PH/84D-6) Avail: NTIS HC A09/MF A01 CSCL 20/8

This thesis developed a finite element solution of the Schrodinger wave equation. This technique is used by a computer program to calculate the energy levels and wave functions of a diatomic molecular for a particular potential energy model. The potential energy model is a function of a set of parameters which a non-linear minimization routine varies before solving the wave equation. This is done in an iterative manner until the calculated energy levels agree in a least squares sense with the observed energy levels. Then the transition probabilities (Franck-Condon factors) between the wave functions are calculated by another program developed for this thesis. Finally, two programs were written to determine the energy levels observed in spectroscopic data. One uses Dunham coefficients and the Dunham equation while the second uses a least square fit to the data directly. The four programs were tested and appear to work correctly. The numeric solutions were compared with the analytic solutions of the single harmonic oscillator. GRA

N85-27210# Yale Univ., New Haven, Conn.
POPULATION INVERSION IN LASER-INITIATED VACUUM ARCS Annual Report, 1 Feb. 1984 - 31 Jan. 1985
M. Krishnan 25 Jan. 1985 54 p
(Grant AF-AFOSR-0077-81)
(AD-A151958; AFOSR-85-0258TR) Avail: NTIS HC A04/MF A01 CSCL 20/5

A detailed study of resonant photo-excitation of CII ions in a vacuum arc discharge by line radiation from laser produced, AlIII ions was completed. Although enhanced fluorescence by up to a factor of eight in CII at 2138 A was observed, the collisional-radiative kinetics are such as to prevent a population inversion from building up under the conditions of the experiments. This unfavorable conclusion prompted the identification of a new class of Be-like, photo-excited lasers with potential laser wave-lengths from 2177 A in CIII down to 230 A in MgIX. Design considerations for such lasers are presented. Initial experiments in CIII pumped by MnVI line radiation have shown fluorescence enhancements in CIII at 2177 A by up to a factor of 150. Optimization of the pump plasma geometry has increased this enhancement to a factor of 500. Gain estimates are given which suggest that a laser can be constructed at 2177 A. GRA

N85-27211# Schafer (W. J.) Associates, Inc., Arlington, Va.
SHORT WAVELENGTH CHEMICAL LASER (SWCL) WORKSHOP Final Report, 1 Sep. 1984 - 31 Aug. 1985
W. Watt 5 Dec. 1984 42 p Workshop held in Charleston, S.C., 14-15 Nov. 1984
(Contract F49620-84-C-0104)
(AD-A151959; WJSA-R85T-03; AFOSR-85-0277TR) Avail: NTIS HC A03/MF A01 CSCL 20/5

The workshop was held for the purpose of identifying the government's interest in SWCL technology, reviewing past and present efforts in this area and presenting the government's plans for a new thrust in SWCL source development. In addition, the workshop was to provide a forum for interaction between members of the Strategic Defense Initiation Organization (SDIO) and the 6.1 agencies with the technical community in order to create an enthusiastic response to the SWCL thrust and to generate new concepts as well as to involve new participants in this technically challenging area. This document contains abstracts of papers presented at the workshops. Some of the topics discussed in the sessions include: HF Lasers - What have we learned?; Chemical Oxygen Iodine Laser Review; Why So FEw Chemical Lasers?; Approach to Efficient Short-Wavelength Chemical Lasers; Metal/Oxidizer Systems; Pyrotechnic Systems; Metastable State Production; Metastable Transfer Systems; Energy Exchange Mechanisms. GRA

N85-27212# Washington State Univ., Pullman. Dept. of Physics.
INVESTIGATION OF BASIC CHARACTERISTICS OF LASER HEATING IN THERMOLUMINESCENCE AND OF LASER-STIMULATED LUMINESCENCE Annual Summary Report, 15 Jul. 1984 - 14 Jul. 1985
P. F. Braunlich 15 Mar. 1985 66 p
(Contract N00014-82-K-0529; RR0-1107)
(AD-A152143) Avail: NTIS HC A04/MF A01 CSCL 20/5

Experimental and computational methods are presented for the complete characterization of the thermoluminescence response obtained from semi-infinite slabs of thermoluminescent phosphors upon exposure to localized Gaussian laser heating beams. A number of different phosphor configurations are described as examples. These include LiF:Mg,Ti (TLD-100, Harshaw Chemical Corporation) in form of chips, which are widely used in the dosimetry of ionizing radiation, and thin layer dosimeters prepared either as self-supporting films of powder in a polyimide matrix, or on substrates of LiF single crystals or borosilicate glass. It is demonstrated that all relevant optical and thermal properties of the dosimeters can be determined by these methods and that, based on this knowledge, the expected thermoluminescence response of a given configuration can be simulated as a function of a number of experimental parameters. GRA

N85-27213# Berkeley Scientific Translation Service, Calif.
INTERNAL STEP-UP TYPE HIGHER HARMONIC LIGHT GENERATING DEVICE
Toshio Sato 30 Jan. 1985 15 p Transl. into ENGLISH of Japanese Patent Appl. Kokai No. 57-198671, 1982 Prepared for

Lawrence Livermore Lab.
(Contract W-7405-eng-48)
(DE85-007026; UCRL-Trans-12033) Avail: NTIS HC A02/MF A01

The invention consists of a higher harmonic light generating device in which a Brewster window part is installed between a generating crystal part and a laser material. Fundamental frequency light is caused to be incident on the generating crystal part as ordinary rays of P polarized light, and the second harmonic light generated as extraordinary rays is caused to be directly incident on the output mirror, so that second harmonic light can be efficiently extracted from the laser resonator. DOE

N85-27214# Los Alamos Scientific Lab., N. Mex.
TWO-DIMENSIONAL BEAT WAVE ACCELERATION SIMULATION
J. M. Kindel, D. W. Forslund, W. B. Mori (California Univ., Los Angeles), C. Joshi (California Univ., Los Angeles), and J. M. Dawson (California Univ., Los Angeles) 1984 7 p Presented at the Intern. Conf. on Lasers '84, San Francisco, Nov. 1984 Submitted for publication
(Contract W-7405-eng-36)
(DE85-005961; LA-UR-85-233; CONF-8411153-1) Avail: NTIS HC A02/MF A01

Finite laser beam particle simulations of beat wave acceleration show that a coherent plasma wave excited by two colinear laser beams at a difference frequency equal to the plasma frequency can produce maximum electron energies as predicted by simple one dimensional theory. The time to saturation amplitude of the plasma wave electric field agrees with the Rosenbluth-Liu theory. Stimulated Raman scattering does not appear to degrade the electron acceleration process. Eventually self-focussing and filamentation limit the lifetime of the coherent plasma wave to tens of picoseconds for an intense CO2 laser beam. DOE

N85-27215# Los Alamos Scientific Lab., N. Mex.
DESIGN OPTIMIZATION OF SINGLEMAIN-AMPLIFIER KrF LASER-FUSION SYSTEMS
D. B. Harris and J. H. Pendergrass 1985 7 p refs Presented at 6th Topical Meeting on the Technol. of Fusion Energy, San Francisco, 3 Mar. 1985
(Contract W-7405-eng-36)
(DE85-007680; LA-UR-85-702; CONF-850310-21) Avail: NTIS HC A02/MF A01

KrF lasers appear to be a very promising laser fusion driver for commercial applications. The Large Amplifier Module for the Aurora Laser System at Los Alamos is the largest KrF laser in the world and is currently operating at 5 kJ with 10 to 15 kJ eventually expected. The next generation system is anticipated to be a single-main-amplifier system that generates approximately 100 kJ. This paper examines the cost and efficiency tradeoffs for a complete single-main-amplifier KrF laser fusion experimental facility. It was found that a 7% efficient $310/joule complete laser-fusion system is possible by using large amplifier modules and high optical fluences. DOE

N85-27216# Institut Franco-Allemand de Recherches, St. Louis (France).
THE DEVELOPMENT OF ONBOARD LASER VELOCIMETER AT THE SAINT LOUIS INSTITUTE (FRANCE) FROM 1976 TO 1982 Final Report [LE DEVELOPEMENT DU VELOCIMETRE LASER EMBARQUABLE A L'ISL DE 1976 A 1982]
B. C. Jaeggy 18 May 1983 61 p refs In FRENCH
(Contract DTCA-STPA-81.95003)
(ISL-NB-402/83) Avail: NTIS HC A04/MF A01

The development of an onboard laser velocimeter to study the aerodynamic fields on a real aircraft is described. The system was required to have high light intensity, low electricity consumption and limited dimensions. A dye laser was developed and nine test series were carried out (seven in actual flight). The system is operational but with limitations. A development based on a YAG laser is described. Author (ESA)

N85-27217# Centre d'Etudes et de Recherches, Toulouse (France). Dept. d'Etudes et de Recherches en Optique.
STUDY ON A PRISMATIC DYE VAT [ETUDE D'UNE CUVE A COLORANT PRISMATIQUE]
Y. Aubry, M. Betbeder, and M. Barillot Nov. 1984 145 p refs In FRENCH
(CERT-2/6124-04-RO) Avail: NTIS HC A07/MF A01

A pumping system where the dye volume, of cylindrical shape, is pumped in all four rectangular directions is studied. The colorant vat is made of quartz and presents a prismatic external shape. Pumping is done by a YAG laser at a doubled frequency. Anomalies in the observed light absorption along a radial path are probably related to colorant absorption by the cavity walls. The system works in an open configuration with 1% yield. Better sensibility but greater inhomogeneity are observed as the dye concentration increases. Author (ESA)

N85-26644# Thomson-CSF, Issy les Moulineaux (France).
OPTMIZING THE SPECIFICATIONS FOR AN AIR-SURFACE LASER SYSTEM [OPTIMISATION DES SPECIFICATIONS DUN SYSTEME AIR-SURFACE LASER]
Jean-Pierre Murgue and Didier Evrard (MATRA Service Aerodynamique, Velizy-Villacoublay, France) *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 7 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26649# Societe Francaise d'Equipements pour la Navigation Aerienne, Velizy-Villacoublay (France). Dept. Inertie et Optique.
GYROLASER GUIDANCE SYSTEM FOR MEDIUM RANGE MISSILES
Bernard deSalaberry *In* AGARD Cost Effectiveness and Affordable Guidance and Control Systems Feb. 1985 11 p refs In FRENCH; ENGLISH summary (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26775# Joint Publications Research Service, Arlington, Va.
ACADEMICIAN ZUYEV NOTES PLANS FOR LASERS ON SPACECRAFT FOR ATMOSPHERIC RESEARCH Abstract Only
V. Dolmatov and Vladimir Yevseyevich Zuyev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 3-4 Transl. into ENGLISH from Sov. Rossiya (Moscow), 29 Jan. 1985 p 1 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27053# Joint Publications Research Service, Arlington, Va.
IMPACT OF OPTICAL INHOMOGENEITY IN SINTERED INTERFACE BETWEEN GLASSES ON LASER EMISSION CHARACTERISTICS Abstract Only
A. G. Murzin, N. A. Soldakova, V. A. Fromzel, and A. D. Tsvetkov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 47-48 Transl. into ENGLISH from Opt. i Spektrosk. (Moscow), v. 55, no. 5, Nov. 1983 p 940-944 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27075# Joint Publications Research Service, Arlington, Va.
DEVELOPMENT, IMPLEMENTATION OF INDUSTRIAL LASERS REVIEWED
N. Rybakov *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 25-26 Transl. into ENGLISH from Sov. Rossiya (USSR), 27 Mar. 1984 p 1 (For primary document see N85-27071 16-31)
Avail: NTIS HC A05

N85-27080# Joint Publications Research Service, Arlington, Va.
USES OF LASER TECHNOLOGY DESCRIBED

In its East Europe Rept.: Sci. and Technol. (JPRS-ESA-85-019) 21 May 1984 p 6-7 Transl. into ENGLISH from Rude Pravo (Prague), 3 Apr. 1985 p 4 (For primary document see N85-27077 16-31)
Avail: NTIS HC A03/MF A01

N85-27417*# Harvard Univ., Cambridge, Mass.
THE COPPER VAPOR LASER Final Report
In its Meas. of Elements in the Stratosphere 1985 p 42-91 refs
(For primary document see N85-27414 16-46)
Avail: NTIS HC A16/MF A01 CSCL 20E

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N85-27218 Virginia Polytechnic Inst. and State Univ., Blacksburg.
AN ANALYTICAL INVESTIGATION OF DYNAMIC COUPLING IN NONLINEAR, GEARED ROTOR SYSTEMS Ph.D. Thesis
Joseph Wayne David 1984 170 p
Avail: Univ. Microfilms Order No. DA8500906

The topic of dynamic response of geared rotor systems is addressed. In particular, the effects of second-order coupling terms (dynamic coupling) in the disk equations of motion on the predicted response of geared rotor systems are investigated. The equations of motion for a rigid disk attached to a rotating shaft are derived. A qualitative analysis of these equations shows that the dynamic-coupling terms, neglected in most conventional rotor analyses, are important in geared systems. The harmonic-balance technique is shown to provide good approximate solutions to these types of nonlinear differential equations even with large nonlinearities. Two test problems having large nonlinearities are solved by the harmonic-balance technique. The results compare well with numerical solutions. The harmonic-balance technique was used to develop a nonlinear transfer matrix modeling technique which provides a route to a generalized geared-rotor modeling technique. Finally, a transfer matrix model of a trial geared system is developed to show that the inclusion of dynamic coupling produces significant changes in the predicted response. Dissert. Abstr.

N85-27219 Central Electricity Generating Board, London (England).
METHOD OF INVESTIGATING ACCUMULATIONS OF DAMAGE TO WELD JOINTS IN THE CASE OF LOW-CYCLE CREEP
A. I. Tarnovskii, Yu. V. Poletayev, A. S. Zubchenko, and S. I. Feklistov 28 Mar. 1985 8 p refs Transl. into ENGLISH from Avtomat. Svarka (USSR), no. 11, 1982 p 15-17
(BLL-CE-Trans-8088-(9022.09)) Avail: British Library Lending Div., Boston Spa, England

The main material used for constructing fast reactors is austenitic steel capable of withstanding conditions, which give rise to low-cycle thermal and mechanical fatigue, corrosion effects and brittle failure, particularly local failure in the heat-affected zone. The existing methods of determining the tendency to local failure in the heat affected zone in the case of high-temperature operation do not take account of the sign-changing cyclical nature of weld joints to a load involving an accumulation of damage due to fatigue and creep. A method was developed for investigating the tendency of weld joints to local failure in the heat-affected zone under conditions of sign-changing low-cycle loading with lengthy holding times at creep temperatures (low-cycle creep). The operational reliability of weld joints is assessed on the basis of the ability of the metal to resist the formation of cracks (crack resistance) and the propagation of cracks (cracking stability). B.W.

N85-27220 British Gas Corp., London (England).
SOLID STATE BONDING OF MOLYBDENUM AND TZM
H-G. Mayer and G. Haufler 26 Mar. 1985 6 p Transl. into ENGLISH from Planseeber. Pulvermetall. (Austria), v. 26, 1978 p 157-171
(BLL-T6439/BG/LRS/LRST751/85) Avail: British Library Lending Div., Boston Spa, England

Solid state bonding of reactive metals requires a suitable welding plant with oil free, high vacuum, graphite free pressure rams and reproducible conditions of heat and pressure application. For the joining of molybdenum and TZM without the use of interlayers welding temperatures above the recrystallization temperature are necessary if good bondage is to be achieved. With an interlayer, molybdenum and TZM can be welded below the recrystallization temperature, titanium providing the highest strength values and vacuum tight joints. For molybdenum the strength of the base material and a ductile weld are achieved. For TZM the intermediate layer is strength determining. Here forms of interlayers - e.g., layers produced by evaporating the filler material - have to be tried in order to reduce the layer thicknesses and the surfaces. With the prototype welding unit small items of equipment made of molybdenum were welded in vacuum tight manner. Author

N85-27221 British Library Lending Div., Boston Spa (England).
UNDERWATER PIPELINE: WELDING BY HIGH FREQUENCY INDUCTION
I. S. Barbini 30 Jan. 1985 8 p refs Transl. into ENGLISH from Mach. Mod. (France), no. 846, Jun. 1980 p 26-29
(BLL-WI-Trans-682-(9312.57)) Avail: British Library Lending Div., Boston Spa, England

Underwater welding using high frequency induction heating was examined. Tests carried out on a periodic generator confirm that it is possible to weld and braze immersed metal components using this technique. The qualities of the weld need to be improved and made more reliable. B.G.

N85-27222 British Library Lending Div., Boston Spa (England).
SPECIAL FEATURES OF THE ONE-SIDED AUTOMATIC WELDING OF STRUCTURES OF Al-Mg ALLOYS
V. S. Mikhailow, V. P. Pshenichykh, and A. I. Dremlyuga 30 Jan. 1985 11 p refs Transl. into ENGLISH from Sudostroenie (USSR), no. 2, 1980 p 35-38
Avail: British Library Lending Div., Boston Spa, England

One side welding with no edge preparation is the most economical method of butt joints in vessel structures of aluminum magnesium alloys in mechanized flow lines. This technique makes it possible to reduce the number of sites and improves the working condition of personnel. The application of the local centered clamping of the weld edges greatly reduces the force parameters of assembly welding equipment, and, in addition to the strong fixing of the weld edges, markedly reduces the magnitude of welding strains. B.G.

N85-27223 Welding Inst., Cambridge (England).
WELDER TRAINING/WELDER TESTING
30 Jan. 1985 13 p Transl. into ENGLISH from ZIS-Mitt. (West Germany), no. 11, 1980 p 1214-1220
(BLL-WI-Trans-683-(9312.57)) Avail: British Library Lending Div., Boston Spa, England

There are various areas of weakness in the conventional training of arc welders, which negatively influence the overall result in such a manner that the course time is exceeded, a number of trainees fail to achieve the course objective and the level which is attained is all in all not entirely satisfactory. Based on the recognition of these shortcomings, investigations were carried out into teaching trainees arc welding, with a view to eliminating the existing areas of weakness, to raise the educational effectiveness of the lessons, to make the training more rational and effective and to achieve an improvement in the overall quality. Particular importance is given to the use of television techniques in this training. E.R.

N85-27224 British Library Lending Div., Boston Spa (England).
HAZARDS IN WELDING DUE TO OXYGEN CHANGES IN THE WORKPLACE ATMOSPHERE
E. Zorn 30 Jan. 1985 30 p refs Transl. into ENGLISH from Schweissen Schneiden (West Germany), vo. 24, no. 4, 1972 p 113-117
(BLL-Wi-Transl-684-(9312.57)) Avail: British Library Lending Div., Boston Spa, England

For the purpose of breathing in a nitrogen/oxygen atmosphere at normal pressure, it is permissible for the oxygen content to be between 17 and 50 vol. % without posing any health hazard for healthy adults. The ventilation of the welding area must be adjusted,

not only to cope with the harmful gases generated, but to the reduction of the oxygen level in welding, and to the increase in the oxygen level produced in flame cutting. From the point of view of fire risk and the processes of ignition and combustion of working clothes, only oxygen enrichment has any bearing. B.G.

N85-27225 British Library Lending Div., Boston Spa (England).
SOURCES OF IMPROVEMENT IN QUALITY OF CONTACT BUTT WELDING OF WIRE
V. A. Budilovski 23 Jan. 1984 5 p ref Transl. into ENGLISH from Stal (USSR), no. 7, 1984 p 63-64
(BLL-M-36085-(5828.4)) Avail: British Library Lending Div., Boston Spa, England

Reducing the upsetting pressure, reducing the weight of the travelling rest of the welding machine and increasing the weld current output of the welding transformer (with minimal short-current impedence values) improves were welding quality 10 to 12%. The results of this investigation may be used to select the welding parameters for modernizing existing and developing new butt welding equipment. G.L.C.

N85-27226*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FATIGUE CRITERION TO SYSTEM DESIGN, LIFE AND RELIABILITY
Erwin V. Zaretsky 10 Jul. 1985 22 p refs Presented at the 21st Joint Propulsion Conf., Monterey, Calif., 8-10 Jul. 1985; sponsored by AIAA, SAE and ASME
(NASA-TM-87017; E-2562; NAS 1.15:87017) Avail: NTIS HC A02/MF A01 CSCL 14D

A generalized methodology to structural life prediction, design, and reliability based upon a fatigue criterion is advanced. The life prediction methodology is based in part on work of W. Weibull and G. Lundberg and A. Palmgren. The approach incorporates the computed life of elemental stress volumes of a complex machine element to predict system life. The results of coupon fatigue testing can be incorporated into the analysis allowing for life prediction and component or structural renewal rates with reasonable statistical certainty. Author

N85-27227*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LIFE AND RELIABILITY MODELING OF BEVEL GEAR REDUCTIONS
M. Savage (Akron Univ., Ohio), C. K. Brikmanis (Akron Univ., Ohio), D. G. Lewicki (Army Research and Technology Lab., Cleveland), and J. J. Coy (Army Research and Technology Lab., Cleveland) 13 Mar. 1985 24 p refs Presented at the Natl. Design Eng. Conf., Chicago, 11-13 Mar. 1985; sponsored by ASME
(NASA-TM-87006; E-2549; NAS 1.15:87006; USAAVSCOM-TR-85-C-3) Avail: NTIS HC A02/MF A01 CSCL 13I

A reliability model is presented for bevel gear reductions with either a single input pinion or dual input pinions of equal size. The dual pinions may or may not have the same power applied for the analysis. The gears may be straddle mounted or supported in a bearing quill. The reliability model is based on the Weibull distribution. The reduction's basic dynamic capacity is defined as the output torque which may be applied for one million output rotations of the bevel gear with a 90 percent probability of reduction survival. Author

N85-27228*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FATIGUE LIFE ANALYSIS OF A TURBOPROP REDUCTION GEARBOX
David G. Lewicki (Army Research and Technology Lab., Cleveland, Ohio), Joseph D. Black (Detroit Diesel Allison, Indianapolis, Ind.), Michael Savage (Akron Univ.), and John J. Coy (Army Research and Technology Lab., Cleveland, Ohio) 1985 25 p refs Prepared for presentation at the Design Tech. Conf., Cincinnati, 11-13 Sep. 1985; sponsored by ASME
(NASA-TM-87014; E-2559; NAS 1.15:87014; USAAVSCOM-TR-84-C-4) Avail: NTIS HC A02/MF A01 CSCL 13I

A fatigue life analysis of the Allison T56/501 turboprop reduction gearbox was developed. The life and reliability of the gearbox was based on the lives and reliabilities of the main power train bearings and gears. The bearing and gear lives were determined using the Lundberg-Palmgren theory and a mission profile. The five planet bearing set had the shortest calculated life among the various gearbox components, which agreed with field experience where the planet bearing had the greatest incidences of failure. The analytical predictions of relative lives among the various bearings were in reasonable agreement with field experience. The predicted gearbox life was in excellent agreement with field data when the material life adjustment factors alone were used. The gearbox had a lower predicted life in comparison with field data when no life adjustment factors were used or when lubrication life adjustment factors were used either alone or in combination with the material factors. Author

N85-27229# Air Force Inst. of Aviation Medicine, Manching (West Germany). School of Engineering.
CREATING A MOBILE AUTONOMOUS ROBOT RESEARCH SYSTEM (MARRS) M.S. Thesis
T. E. Clifford and H. G. Schneider, III Dec. 1984 259 p
(AD-A151963; AFIT/GE/ENG/84D-19) Avail: NTIS HC A12/MF A01 CSCL 06/4

The Mobile Autonomous Robot Research System (MARRS-1) was created as the first of a series of autonomous vehicle prototypes for the Air Force Institute of Technology. The major accomplishment in developing MARRS-1 is the integration of Optical Shaft Encoder (OSE) data with Ultrasonic Sonar range and direction information to produce accurate environmental maps that are relative to the robot. The OSE and Sonar subsystems make up the most important part of MARRS-1's Navigation Computer. With these two subsystems and minimal additional software, mapping and obstacle avoidance become a reality. The thesis includes schematics, parts list, and software listings for the MARRS-1 Navigation Computer. Additionally, the mapping and navigation algorithms are shown implemented in the BASIC language with numerous example graphics maps created by the integrated MARRS-1 robot. Issues involved in solving mobile robotics problems are discussed. GRA

N85-27230# Naval Postgraduate School, Monterey, Calif.
A GENERAL SIMULATION PROGRAM FOR ROBOT MANIPULATOR ARM DYNAMICS M.S. Thesis
G. R. McGalliard Sep. 1984 160 p
(AD-A152121; AD-E401303) Avail: NTIS HC A08/MF A01 CSCL 06/4

A computer program is presented which implements a recursive Lagrange formulation of open-loop kinematic chain equations of motion for the purpose of providing a generalized dynamic model of robot manipulator arms. The dynamic model was verified against results known for a PUMA arm, obtaining joint accelerations given current positions, velocities, and torques. The FORTRAN program was executed on an IBM 3033 digital computer and can accommodate most physical robotic configurations. Additionally, an attempt has been made to simulate manipulator motion using the verified model and previously published integration methods. Comparison of simulation results against known results provide evidence that additional work must be accomplished in the area of solution iteration. GRA

N85-27231# Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Robotics and Fabrication Technology Div.
A ROBOTIC SYSTEM FOR PREPARING REAGENT AND DILUTION VIALS
G. M. Dyches Mar. 1985 67 p refs
(Contract DE-AC09-76SR-00001)
(DE85-008262; DPST-84-278) Avail: NTIS HC A04/MF A01

A robotic system was developed for repetitively filling dilution and reagent vials in the 772-F Laboratory Facility of SRP. Approximately 10,000 vials per month (may range from 6000 to

16,000) are filled with standard volumes of HNO3, Al(NO3)3, or KSCN for use in analyzing process samples from 221-F and 221-H. The intent of this system is to provide an automated method of filling this large quantity of vials so that technician time can be more fully utilized. The system is based around the Zymate Laboratory Automation System for performing all vial movement filling, and control of other system components. This system provides versatility for future changes through the software and provides easy interfacing capability to non-Zymate components. The Zymate's versatility also makes it a good candidate for other laboratory applications. Using a single-type system for multiple applications reduces overhead costs. Zymate modules used in this application are the controller, robot, Master Laboratory Station (MLS), Power and Event Controller (PEC), Mettler balance interface, and line printer. DOE

N85-27232# California Univ., Livermore. Lawrence Livermore Lab.
DEVICE FOR PREVENTING INTRUSION OF A BLADE DURING VIBRATION CUTTING OF INTERMITTENT CUTTING WITH A LATHE
Miji Ishii Jan. 1985 6 p Transl. into ENGLISH from Japanese Patent no. Sho 49(1974)-16994 (Appl. no. Sho 47(1972)-57091, 14 Feb. 1974)
(Contract W-7405-eng-48)
Avail: NTIS HC A02/MF A01

A device is described for preventing intrusion of blade tip of the lathe which cuts chips automatically by vibrational cutting or by intermittent cutting, where said device is characterized by applying pressure to the blade in the lifting direction and lifting the blade temporarily by a certain magnitude at the moment when there is zero feed. Author

N85-27233# Institut Franco-Allemand de Recherches, St. Louis (France).
A METHOD FOR THE EVALUATION OF THE RESIDUAL ENERGY OF A METALLIC FRAGMENT AFTER PERFORATION OF A THIN TARGET [METHODE D'EVALUATION DE L'ENERGIE RESIDUELLE D'UN ECLAT APRES PERFORATION D'UNE CIBLE MINCE]
G. Herbette 1 Jun. 1983 33 p refs In FRENCH
(ISL-R-113/83) Avail: NTIS HC A03/MF A01

A method by which the residual energy of a projectile penetrating a thin target can be estimated for any combination of 2 metals and for velocities up to 4000 m/sec is presented. A single experimental observation is sufficient to obtain the curve given the residual energy up to 4000 m/sec initial velocity. Author (ESA)

N85-26877*# SKF Industries, Inc., King of Prussia, Pa.
DEVELOPMENT OF NEW MATERIALS FOR TURBOPUMP BEARINGS
Robert E. Maurer and Robert A. Pallini *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 180-200 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

N85-26878*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
BEARINGS WORKING GROUP
In its Advan. High Pressure O2/H2 Technol. Apr. 1985 p 201-204 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

N85-26879*# Spectra Research Systems, Inc., Huntsville, Ala. Aerospace Systems and Products Div.
ADVANCED ROCKET ENGINE CRYOGENIC TURBOPUMP BEARING THERMAL MODEL
Joe C. Cody, Linda New, and Bruce Tiller *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 205-219 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

N85-26880*# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.
HYBRID BEARINGS FOR LH2 AND LO2 TURBOPUMPS
M. F. Butner and F. C. Lee *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 220-244 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

N85-26881*# TRW Aircraft Components Group, Cleveland, Ohio.
POWDER METALLURGY BEARINGS FOR ADVANCED ROCKET ENGINES Abstract Only
J. N. Fleck, B. J. Killman, and H. Munson *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 245 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

N85-26882*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ROLLING CONTACT FATIGUE LIFE OF CHROMIUM ION PLATED 440C BEARING STEEL
Biliyar N. Bhat and Jack H. Davis (Alabama Univ., Huntsville) *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 246-260 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

N85-26884*# Wyle Labs., Inc., Huntsville, Ala.
SIGNAL ANALYSIS TECHNIQUES FOR INCIPIENT FAILURE DETECTION IN TURBOMACHINERY
Thomas Coffin *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 262-276 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13I

N85-26888*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ROTORDYNAMICS
Luke A. Schutzenhofer *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 341-344 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13I

N85-26890*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PRELIMINARY RESULTS ON PASSIVE EDDY CURRENT DAMPER TECHNOLOGY FOR SSME TURBOMACHINERY
Robert E. Cunningham *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 366-380 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13I

N85-26892*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ROTOR RESPONSE FOR TRANSIENT UNBALANCE CHANGES IN A NONLINEAR SIMULATION
M. J. Hine, C. E. Landis, and R. F. Beatty *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 400-424 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13K

N85-26893*# Wyle Labs., Inc., Huntsville, Ala. Scientific Services and Systems Group.
DAMPING SEAL VERIFICATION SETUP
Klaus L. Cappel *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 425-437 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11A

N85-26894*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DAMPING SEALS FOR TURBOMACHINERY
George L. vonPragenau *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 438-451 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 11A

N85-27037# Joint Publications Research Service, Arlington, Va.
STRUCTURAL DESIGN AND KINEMATIC CONFIGURATION OF TWO-ARMED ROBOTS Abstract Only
I. I. Pavlenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 18 Transl. into ENGLISH from Vest. Mashinostroyeniya (Moscow), no. 12, Dec. 1983 p 5-9 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27038# Joint Publications Research Service, Arlington, Va.
EXPERIENCE WITH INTRODUCTION OF FINISH PERFORATION OF PRECISION PARTS FOR OPTICAL INSTRUMENTS Abstract Only
N. S. Vishnevskiy, Yu. N. Neugomonov, and V. V. Mazitov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 18-19 refs Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 37-40 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27039# Joint Publications Research Service, Arlington, Va.
CALCULATING RELIABILITY AND PRODUCTIVITY OF COLD STAMPING ROBOT COMPLEX AS QUEUING SYSTEM Abstract Only
L. G. Stepanskiy and M. A. Kryuchkov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 19 refs Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 36-37 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27040# Joint Publications Research Service, Arlington, Va.
METHOD OF SELECTING ROBOTIZED SYSTEM DESIGN FOR PRESSING PROCESS Abstract Only
N. A. Arkhipenko and N. F. Kravchenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 20 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 34-36 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27041# Joint Publications Research Service, Arlington, Va.
EXPERIENCE OF SHEET STAMPING ROBOTIC COMPLEXES Abstract Only
V. M. Kirasirov, N. N. Kuznetsov, Yu. S. Pochtar, and N. V. Travkin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 20-21 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 31-33 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27042# Joint Publications Research Service, Arlington, Va.
AUTOMATIC MANIPULATORS FOR FORGING ROLLERS Abstract Only
F. A. Gladkov, A. M. Ryabov, V. A. Sazonenko, G. I. Sklyarova, and V. N. Sokolov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 21 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 29-31 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27043# Joint Publications Research Service, Arlington, Va.
UPDATING MODEL RPD-1.25 INDUSTRIAL ROBOT Abstract Only
L. B. Sachkov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1985 p 21-22 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 27-29 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27044# Joint Publications Research Service, Arlington, Va.
INDUSTRIAL ROBOTS AND AUTOMATIC MANIPULATORS FOR FORGING AND PRESSING OPERATIONS AT SECOND INTERNATIONAL EXHIBITION Abstract Only
R. K. Dezhurov and N. V. Koloskov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 22 Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 25-27 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27045# Joint Publications Research Service, Arlington, Va.
NEW STAGE IN ROBOTICS DEVELOPMENT Abstract Only
Ya. A. Shifrin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 25-26 refs Transl. into ENGLISH from Kuznechno-Shtampovochnoye Proizvod. (Moscow), no. 1, Jan. 1984 p 13-14 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27046# Joint Publications Research Service, Arlington, Va.
NON-CONTACT HYDROSTATIC BEARINGS Abstract Only
M. A. Shimanovich *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 26 refs Transl. into ENGLISH from Mashinostritel (Moscow), no. 12, Dec. 1983 p 19 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27047# Joint Publications Research Service, Arlington, Va.
CONTROL OF MOTION OF MANIPULATOR ROBOTS ON BASIS OF FIRST-ORDER KINEMATIC ALGORITHMS Abstract Only
P. D. Krutko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 26-27 refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Mashinostr. (Moscow), no. 9, Sep. 1983 p 46-52 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27070# Joint Publications Research Service, Arlington, Va.
TOOTH WEAR IN WORM GEARS IN VACUUM Abstract Only
Ye. A. Deulin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 76 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Mashinostroyeniye (Moscow), no. 12, Dec. 1983 p 42-47 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27072# Joint Publications Research Service, Arlington, Va.
INSTITUTE'S CONTRIBUTION TO SOVIET WELDING TECHNOLOGY NOTED
G. Nikolayev *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 6-10 Transl. into ENGLISH from Pravda Ukrainy (USSR), 4 Jan. 1984 p 4 (For primary document see N85-27071 16-31)
Avail: NTIS HC A05

N85-27074# Joint Publications Research Service, Arlington, Va.
NEW ROBOTIZED, VERTICAL BROACHING MACHINE FEATURED
K. Y. Levin, A. Z. Tsymkovskiy, and V. A. Yaroshevich *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 22-24 Transl. into ENGLISH from Mekh. i Avtomat. Proizvodstva (USSR), no. 3, Mar. 1984 p 7-9 (For primary document see N85-27071 16-31)
Avail: NTIS HC A05

N85-27076# Joint Publications Research Service, Arlington, Va.
GUIDELINES FOR OPTIMIZATION OF ROBOTIZED MACHINING CELLS
A. Y. Baryshnikov and S. V. Ilin *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 46-50 Transl. into ENGLISH from Mekh. i Avtomat. Proizvodstva (USSR), no. 1, Jan. 1984 p 23-24 (For primary document see N85-27071 16-31)
Avail: NTIS HC A05

N85-27078# Joint Publications Research Service, Arlington, Va.
PATON INSTITUTE EXPERT ON GDR-USSR WELDING RE-

SEARCH
Dieter Resch *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-85-019) 21 May 1985 p 1-2 Transl. into ENGLISH from Berliner Zeitung (East Berlin), 16-17 Mar. 1985 p 3 (For primary document see N85-27077 16-31)
Avail: NTIS HC A03/MF A01

N85-27107*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A DESCRIPTION OF THE 64-METER ANTENNA ELEVATION DRIVE GEARS AND THEIR STRANGE WEAR
H. McGinness *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 116-135 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 13I

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N85-27234 British Library Lending Div., Boston Spa (England).
EXTREME EVALUATION OF RELIABILITY INDICES FOR COMPONENTS OF METALLURGICAL EQUIPMENT
V. K. Tsapko 23 Jan. 1984 9 p refs Transl. into ENGLISH from Izv. VUZ Chern. Met. (USSR), v. 6 1984 p 140-143
(BLL-M-36070-(5828.4)) Avail: British Library Lending Div., Boston Spa, England

A method is described for defining extreme reliability characteristics of components of metallurgical equipment. A formula is given for defining the component reliability indices. Author

N85-27235 British Library Lending Div., Boston Spa (England).
MAGNETIC METHOD OF INSPECTING MECHANICAL PROPERTIES OF GENERAL PURPOSE TUBES
E. M. Sadygov, Yu. G. Isaev, N. G. Yaraliev, and G. M. Aliev 23 Jan. 1984 6 p refs Transl. into ENGLISH from Stal (USSR), no. 7, 1984 p 56-57
(BLL-M-36084-(5828.4)) Avail: British Library Lending Div., Boston Spa, England

Mathematical statistics and the results of mechanical testing and coercivity measurements are used to establish the reliabilities and confidence ranges of the relations between demagnetization current (coercivity) and the mechanical properties of general purpose tubes. G.L.C.

N85-27236 Metals Society, London (England).
ECHO-RESPONSE FROM CRACK-LIKE TWO-DIMENSIONAL REFLECTORS IN FOCUSED ULTRASONIC FIELDS. ULTRASONIC CRACK TIP METHOD FOR THE DETERMINATION OF CRACK DEPTH
F. Walte, W. Mueller, A. Hess, and C. Thomas 31 Jan. 1984 25 p refs Transl. into ENGLISH from Materialpruefung, (West Germany), v. 25, no. 5, pt. 1, 1983 p 155-158 and Materialpruefung (West Germany), v. 25, no. 7, pt. 2, 1983 p 235-237 and Materialpruefung (West Germany), v. 25, no. 10 p 340
(BLL-Bisi-22062-(9022.06)) Avail: British Library Lending Div., Boston Spa, England

Methods for detecting and analyzing defects are given. The dependence on obliquity and the effect of roughness and the determination of defect length and the effects of edge diffraction are discussed. The crack-tip method for determination of crack depth is also described. B.G.

N85-27237# Centre d'Essais Aeronautique Toulouse (France). Groupe de Travail Fiabilite.
GUIDE FOR THE EXECUTION OF RELIABILITY TESTS IN THE LABORATORY [GUIDE POUR LA REALISATION D'ESSAIS DE FIABILITE EN LABORATOIRE]
10 Oct. 1984 208 p refs In FRENCH Sponsored by Delegation Generale pour l'Armement
Avail: NTIS HC A10/MF A01

The guide includes reliability mathematics, reliability test planning, administration aspects, experimental design, estimation of reliability parameters, report content and information storage and retrieval. Author (ESA)

N85-27238# Centre National d'Etudes Spatiales, Toulouse (France).
CHARACTERIZATION OF SOLDERLESS MINIWRAPPING CONNECTIONS [ETUDE DE CARACTERISATION DE LA TECHNIQUE DE LIAISON PAR CONNEXIONS ENROULEES MINIATURES]
Serge Clement and Francoise deBentzmann 1984 93 p In FRENCH; ENGLISH summary
(CNES-NT-112) Avail: NTIS HC A05/MF A01

Miniature wrapping connections for aerospace application, including tools and operation techniques, connectors, wire characteristics, applicable quality tests, and reliability were studied. It is concluded that the technique is very reliable and the utilization in the aerospace industry is recommended. Author (ESA)

N85-26643# Politecnico di Milano (Italy).
THE EVOLUTIVE STATE: A NEW DEFINITION OF SYSTEM STATE TO INCLUDE SEQUENCING OF EVENTS
V. Amoia and R. Somma (Selenia Spazio, Rome, Italy) *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 14 p refs (For primary document see N85-26638 16-38)
Avail: NTIS HC A13/MF A01

N85-26864*# Rocketdyne, Canoga Park, Calif.
FATIGUE LIFE EXTENSION
D. E. Matejczyk and J. Lin *In* NASA. Marshall Space Flight Center. Advan. High Pressure O2/H2 Technol. Apr. 1985 p 20-35 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14D

N85-26865*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THRUST CHAMBER LIFE PREDICTION
Harold J. Kasper *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 36-43 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 14D

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N85-27239 Queensland Univ., St. Lucia (Australia). Dept. of Civil Engineering.
EXPERIMENTALLY DETERMINED DISTRIBUTION OF STRESS AROUND A HORIZONTALLY LOADED MODEL PILE IN DENSE SAND
D. J. Williams and R. H. G. Parry Aug. 1983 23 p refs
(CE-43) Avail: NTIS HC A02/MF A01

The distribution of stress around a horizointally loaded model pile in dense sand was determined. The stress in the horizontal plane was nonuniform and directed radially towards the pile around its circumferences. It is assumed that the horizontal load is resisted solely by a stress uniform across the width of the pile and directed parallel to the horizontal load. The analysis does not account stresses not aligned with the horizontal load, which is found to underestimate the resistance of the pile/sand system to horizontal loading. E.A.K.

N85-27240 Polish Academy of Sciences, Poznan. Lab. of Mechanics of Porous Materials.
CONSOLIDATION THEORY WITH CONSIDERATION OF FRAME PLASTICITY [TEORIA KONSOLIDACJI Z UWZGLEDNIENIEM PLASTYCZNOSCI SZKIELETU]
Stefan Jan Kowalski Warsaw 1984 32 p refs In POLISH
(Rept-9/1984; ISSN-0208-5658) Avail: Issuing Activity

Mathematical formulas for static deformation problems in a porous fluid-saturated medium are presented. Elastoplastic porous solids saturated with viscous liquids are emphasized and a plasticity condition is proposed for these solids. Plastic potential is used to derive associated laws of plastic flow. Thermodynamics of irreversible processes are postulated. The problem is physically and geometrically nonlinear. The effect of deformation speed on physical compounds are discussed and the isotropy of the porous fluid-saturated medium is assumed. E.A.K.

N85-27241 Polish Academy of Sciences, Warsaw. Dept. of Construction Theory.
ADAPTATION OF CONTINUOUS BEAMS AND THE METHOD OF OPTIMIZING THE FLEXIBILITY OF THEIR ELASTIC SUPPORTS. THEOREM ON MAXIMAL ADAPTATION LOADING, SUPPLEMENT [PRZYSTOSOWANIE BELEK CIAGLYCH ORAZ METODA OPTYMALIZACJI PODATNOSCI SPREZYSTYCH ICH PODPOR. TWIERDZENIE O MAKSYMALNYM OBCIAZENIU PRZYSTOSOWANIA]
Wanda Paprocka-Garlicka 1984 26 p refs In POLISH
(Rept-10/1984-Suppl; ISSN-0208-5658) Avail: Issuing Activity

A method is proposed to solve the problem of optimization of the elastic support of continuous beams under variable load conditions. Mathematical solutions are presented for three variants of loads applied to a two-span beam. Analysis of these problems permits the formulation of a general theorem on achievement of maximal adaptation loading. Based on this theorem, a method is proposed to designate the optimal flexibility of elastic supports and their maximal adaptation loads. It is demonstrated that relative inflexibility of elastic supports under variable load conditions increases the value of adaptation loading. The mathematical solutions concerning adaptation loading and limiting load capacity are valid only for beams characterized by minimal diffraction.
Transl. by B.G.

N85-27242 Polish Academy of Sciences, Warsaw. Dept. of Construction Theory.
ANALYSIS OF ELASTOPLASTIC GRIDS UNDER CONDITIONS OF VARIABLE LOADS [ANALIZA RUSZTOW SPREZYSTO - PLASTYCZNYCH PRZY OBCIAZENIACH ZMIENNYCH]
Tadeusz Sawicki 1984 161 p refs In POLISH
(Rept-16/1984; ISSN-0208-5658) Avail: Issuing Activity

The limits of variable loads on elastoplastic grids are determined, and the problem of evaluating adaptation displacements is considered. A method is proposed to solving the problem of estimating the distortion of elastoplastic constructions. The estimation technique must be used, since precise determination is practically impossible, particularly in view of the frequently unlimited number of possible loading pathways. The theorems and evaluations of Koiter, Konig, and Brzezinski on shakedown of elastoplastic structures are discussed. E.A.K.

N85-27243 Polish Academy of Sciences, Warsaw. Dept. of Continuous Medium Theory.
OPTIMAL MODELING WITH A MINIMUM OF LOCAL DISTORTION [O OPTYMALNYM MODELOWANIU NA MINIMUM LOKALNEGO UGIECIA]
Jan Holnicki-Szulc 1984 18 p refs In POLISH
(Rept-18/1984; ISSN-0208-5658) Avail: Issuing Activity

The question of minimizing deformation at specific construction points is considered. Two states of loading are examined, a state of external loading defined in a task and an equivalent state of loading with a unitary force. The example of a latticed bracket is used to illustrate external loading and remodeling to minimize local distortion. A general procedure for optimal modeling in the case of an arbitrary bar structure is proposed, based on the obtained results. The proposed procedure permits computer analysis of deformation problems. Transl. by B.G.

N85-27244 Polish Academy of Sciences, Warsaw. Lab. of Deformation Fields.
MULTINOMIAL FORM OF THE SOLUTION OF PROBLEMS OF THE STATISTICS OF ELASTIC RECTANGULAR DISKS [WIELOMIANOWA POSTAC ROZWIAZANIA ZAGADNIEN STATYKI SPREZYSTYCH TARCZ PROSTOKATNYCH]
Stefan Owczarek 1984 154 p refs In POLISH
(Rept-17/1984; ISSN-0208-5658) Avail: Issuing Activity

A method to indicate the state of stress and deformation in elastic rectangular disks with the use of minicomputers and inverted matrices is proposed. The method is based on the use of multinomials to designate a state of tension. The solutions which use this method are only an approximation of actual solutions, due to the given boundary conditions. The accuracy of the method varies in different areas of the disk. The best precision is obtained and the poorest where boundary tensions are not continuous. The obtained results however, do not vary more than 5% from actual solutions. E.A.K.

N85-27245 Polish Academy of Sciences, Warsaw. Dept. of Mechanical Systems.
INTERNAL RESONANCE IN NONLINEAR VIBRATING SYSTEMS [REZONANSE WEWNETRZNE W NIELINIOWYCH UKLADACH DRGAJACYCH CZESC I]
Jozef Bajkowski 1984 22 p refs In POLISH
(Rept-15/1984; ISSN-0208-5658) Avail: Issuing Activity

The response of a nonlinear vibrating two-degree-of-freedom system in cases of internal resonance is analyzed. The frequency of the input function in these cases is approximately equal to the higher main resonance. The analysis is conducted using one of the major methods of investigating nonlinear vibrating systems, the bedding (blending) method. The analysis is purely theoretical. However, the bedding method does allow for the study of both steady and transient electrical states. The bedding method is compared with the Ritz method and the combined Ritz-bedding method. Author

N85-27246 Rensselaer Polytechnic Inst., Troy, N. Y.
AUTOMATIC TRACKING OF CRACK GROWTH VIA FINITE ELEMENTS Ph.D. Thesis
Nabil AbdelBadie Yehia 1984 298 p
Avail: Univ. Microfilms Order No. DA8500972

A new automatic quasi-static crack propagation tracking system was developed. The system combines: (1) available automatic mesh generation; (2) finite element analysis techniques; and (3) fracture criteria into a single geometrically based code which differs substantially from a traditional finite element code both in structure and data base. An introduction is given and the micromechanical failure mechanisms in composite materials are reviewed for both stress concentration and fracture mechanics approaches. The fracture analysis capabilities are discussed, fracture criteria are reviewed and a new modified maximum strain energy density criterion is presented and compared to the other existing fracture criteria. A detailed description of the developed system is given. The component parts of the automatic crack tracking system are presented and discussed. Examples are given to illustrate various capabilities of the system. The developed system was found very effective and powerful in automatically tracking crack propagation.
Dissert. Abstr.

N85-27247 Illinois Univ., Urbana.
FATIGUE DAMAGE AND SMALL CRACK GROWTH DURING BIAXIAL LOADING Ph.D. Thesis
Chang Tsan Hua 1984 169 p
Avail: Univ. Microfilms Order No. DA8502185

The progressive nature of fatigue damage under biaxial loading has been investigated. Experiments were performed on thin-wall tubular specimens of 1045 steel in tension, torsion, and combined tension-torsion loading. Two equivalent strain amplitudes, one in the high cycle fatigue (HCF) region and one in the low cycle

fatigue (LCF) region were employed in this study for all loading patterns: The test program included constant amplitude loading and variable amplitude loading. Two types of variable loading patterns, step loading and block loading, were selected. In the HCF region, cracks nucleated on a few planes. Usually one of them grew into a dominant crack and led to failure. In the LCF region, equally developed microcracks are observed over the entire gage section. The results showed that the damage curve for pure tension can be used to evaluate damage behavior under combined tension-torsion within the tested strain ratios. Dissert. Abstr.

N85-27248 Illinois Univ., Urbana.
ON RESIDUAL STRESS IN AN ELASTIC BODY Ph.D. Thesis
Anne Georgacas Hoger 1984 105 p
Avail: Univ. Microfilms Order No. DA8502176

Residual stress is defined as the stress field supported by a body in the absence of external forces. An elastic body with a particular material symmetry can admit only those residual stress fields that commute with the elements of the symmetry group of the material. Using this condition, one can obtain the forms for residual stress fields appropriate to specific material symmetries. Here the additional restrictions imposed by equilibrium and the zone traction condition are explored. It is shown that if a body is isotropic it supports no residual stress. For bodies that are transversely isotropic, among other results, it is established that the residual stress must vanish if the axis of symmetry is uniform. Bodies composed of material with rhombic or monoclinic symmetry are also considered. States of residual stress possible in a transversely isotropic right circular cylinder are discussed.
Dissert. Abstr.

N85-27249 Illinois Univ., Urbana-Champaign.
CREEP-FATIGUE INTERACTION OF NOTCHED 304 STAINLESS STEEL BARS Ph.D. Thesis
Kuang-Hsi Wu 1984 236 p
Avail: University Microfilms Order No. DA8502349

Circular notched and sharp notched 304 stainless steel specimens were subjected to constant load creep, cyclic loading with hold time and fatigue loadings at 650 C to determine the lives, failure modes and to understand creep fatigue interaction mechanisms. The hold times are one minute and ten minutes. Double notch specimens were used so that the material underr semidamaged condition in one notch can be examined when the other is broken. Stress analysis, the prediction and microstructure studies were carried out. It was found that for circular notched specimens, creep failure mechanism predominates and no creep fatigue interaction takes place. Cyclic loadings have a beneficial effect of prolonging the specimen life at a very short hold time loading. Fracture initiates from the center of the specimen, except at very high frequency tests. At a long hold time the interaction effect is minor. Fracture of all specimens initiates from the notch root. Dissert. Abstr.

N85-27250 Akron Univ., Ohio.
DYNAMIC RESPONSE OF SHELLS AND PLATES SUBJECTED TO VARIABLE MAGNITUDE TRAVELING LOADS Ph.D. Thesis
Ramaswamy Shankaran 1984 318 p
Avail: Univ. Microfilms Order No. DA8500860

The dynamic response of structures subjected to variable magnitude traveling loads is investigated. Shells and plates are used as typical structures. Two cases are considered: one in which the load traverses open trajectories, as in the case of a load moving along an infinite shell or plate strip, and the other in which the load moves in a closed trajectory, as around a shell of revolution. The effect of traveling load variability on viscoelastic type structural behavior is of particular concern. The disposition of critical speeds is central to this problem and therefore emphasis is given to determining the existence of critical speed shifts as well as the occurrence of potential speed bifurcations induced by variable loads. To add generality to the development, the influence of such factors as prestress, anisotropy, Coriols and foundation effects are brought into play. The governing field equations are cast in terms of a moving Lagrangian observer, and the solution to the problem is developed through appropriate space-time warp which enables the transformed equations to be treated as time-dependent with stationary loads. Dissert. Abstr.

N85-27251 Arizona Univ., Tucson.
FINITE AXISYMMETRIC DEFORMATION OF A THIN SHELL OF REVOLUTION Ph.D. Thesis
William James Keppel 1984 126 p
Avail: University Microfilms Order No. DA8500465

The finite axisymmetric deformation of a thin shell of revolution was analyzed. The governing differential equations are given for hyperelastic shell materials with Mooney-Rivlin and exponential strain energy density functions. These equations are solved numerically using a 4th order Runge-Kutta integration procedure. A generalized Newton-Raphson iteration process is used to systematically improve trial solutions of the differential equations. The governing differential equations are differentiated with respect to time to derive associated rate equations. The rate equations are solved numerically to generate the tangent stiffness matrix which is used to determine the load deformation history of the shell with incremental loading. Numerical examples are presented to illustrate the major characteristics of the nonlinear shell behavior. Dissert. Abstr.

N85-27252 Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
THE NONLINEAR ANALYSIS OF THICK COMPOSITE PLATES USING A CUBIC SPLINE FUNCTION Ph.D. Thesis
Ronald L. Hinrichsen 1984 155 p
Avail: University Microfilms Order No. DA8502742

A nonlinear thick composite shell theory is presented in which the through the thickness displacements are modelled using a variation of a cubic spline. The theory is developed by considering the Lagrangian strains in conjunction with the 2nd Piola-Kirchhoff stress. This formulation leads to a theory which encompasses large displacements with moderately large rotations but is restricted to small strains. The imposition of the cubic distribution through the thickness insures that compatibility of the displacements and their first and second derivatives and thus the shear strains are maintained from lamina to lamina. The cubic distribution is seen as a higher order approximation than has been previously employed, but because of the nature of the spline, the theory is less cumbersome and more easily implemented than the parabolic theory. There is no introduction of additional degrees of freedom with the cubic theory. A family of 2-D isoparametric elements is employed in conjunction with the theory to solve a class of 3-D plate problems. Dissert. Abstr.

N85-27253 British Library Lending Div., Boston Spa (England).
PRINCIPLES OF WAVE FORMATION ALONG WEB OF H-BEAMS
A. A. Kirichkov, E. G. Zudov, Yu. P. Petrenko, I. M. German, and V. A. Mochalov 23 Jan. 1984 8 p refs Transl. into ENGLISH from Stal (USSR), v. 6, 1985 p 45-47
(BLL-M-36041-(5828.4)) Avail: British Library Lending Div., Boston Spa, England

The deformation procedures, geometric dimensions of the section and level of residual stresses all have significant influence on wave formation along the web of H-beams. Quantitative relations expressing the rolling and thermal wave parameter as functions of modes of deformation, geometric dimensions of the strip, cooling conditions of the H-beams and level of residual stresses are deduced. A connection is established between rolling wave parameters and thermal wave parameters. Equations for predicting wave formation along the web are presented and rational procedures selected for the production of economically dimensioned H-beams. Partial introduction of the results with respect to the production of 35B to 50B, 35Sh and 35K beams enabled 8 kg/t metal to be economized in 1983, reject and second-grade yield of these items being halved. Author

N85-27254 British Library Lending Div., Boston Spa (England).
FULL STATISTICAL CHARACTERISTICS OF MICRODEFORMATION

A. A. Vainshtein and A. M. Rekov 23 Jan. 1984 4 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Chernaya Met. (USSR), no. 6, 1984 p 156-157
(BLL-M-36076-(5828.4)) Avail: British Library Lending Div., Boston Spa, England

Measurements of microdeformation were made of samples of 38KhS steel with the aid of small base dividing nets on a base 25mmk with macrodeformations of: 3.9, 6.5, 12.1, 14.9, and 15.8%. The hypothesis of the normalcy of distribution was checked by calculation of the third and fourth moments. At each step 2500 meshes were measured. G.L.C.

N85-27255 British Library Lending Div., Boston Spa (England).
MONITORING OF TURBO-MACHINES BY SHAFT VIBRATION MEASUREMENT
H. J. Thomas 30 Jan. 1985 17 p refs Transl. into ENGLISH from VGB-Kraftwerkstechn. (West Germany), v. 61, no. 9, Sep. 1981 p 725-730
(BLL-Trans-7900-(9022.09)) Avail: British Library Lending Div., Boston Spa, England

Shaft vibration measurement in turbo-machines has increasingly established itself as a means for identifying existing or incipient damage. In the course of time, instrumentation has become increasingly complex so that, nowadays, in addition to recording maximum shaft deflection, in many cases, we already record, for every shaft section, the kinetic shaft movement in one or more measuring planes, by oscillographic methods. Nowadays, a number of people, including the manufacturers of measuring instruments, also recommend direct recording of the phase angle. Attention was drawn to the significance of the phase angle in assessment of shaft vibrations. Evidently, sufficiently accurate agreement for quantitative purposes between shaft vibration measurement and results of calculation for the same system can only be achieved by including the phase angle in the measurements. G.L.C.

N85-27256 British Library Lending Div., Boston Spa (England).
QUASI-STEADY VIBRATIONS OF A ROTATING SHAFT GRAZING AN OBSTACLE: SPIRAL VIBRATION
W. Kellenberger 31 Jan. 1985 26 p refs Transl. into ENGLISH from Ing.-Arch. (West Germany), v. 46, 1977 p 349-364
(BLL-CE-Trans-7962-(9022.09)) Avail: British Library Lending Div., Boston Spa, England

A common feature of large steam and gas turbine, large generators and electrical machines with slip rings or collectors is a mechanical vibration problem. Two simple mechanical models viz. a single-and two-disc shaft, which reproduce the measurements on the complicated object with good quality, were used for the numerical treatment of grazing of an obstacle by a shaft. The very slowly rotating vibration vector (at constant speed) results from thermal curvature of the shaft. The tip of the vibration vector runs slowly and quasi-steadily in the order of magnitude of hours on a circular path in the opposite direction to the shaft. The slow migration of the vibration vector can be calculated with good approximation by an algebraic equation without a detour via the non-linear differential equation. Two types of friction were investigated: (1) contact on the obstacle with radial force proportional to the radial deformation at the obstacle; and (2) contact independent of the deformation. B.W.

N85-27257*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Aerospace and Ocean Engineering.
DEVELOPMENT AND APPLICATION OF OPTIMUM SENSITIVITY ANALYSIS OF STRUCTURES Semiannual Progress Report, Aug. - Dec. 1984
J.-F. M. Barthelemy and W. L. Hallauer, Jr. 1984 6 p refs
(Grant NAG1-145)
(NASA-CR-175857; NAS 1.26:175857) Avail: NTIS HC A02/MF A01 CSCL 20K

The research focused on developing an algorithm applying optimum sensitivity analysis for multilevel optimization. The research efforts have been devoted to assisting NASA Langley's Interdisciplinary Research Office (IRO) in the development of a mature methodology for a multilevel approach to the design of complex (large and multidisciplinary) engineering systems. An effort was undertaken to identify promising multilevel optimization algorithms. In the current reporting period, the computer program generating baseline single level solutions was completed and tested out. G.L.C.

N85-27258*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NONLINEAR EQUATIONS FOR DYNAMICS OF PRETWISTED BEAMS UNDERGOING SMALL STRAINS AND LARGE ROTATIONS
Dewey H. Hodges May 1985 35 p refs Prepared in cooperation with Army Research and Technology Labs.
(NASA-TP-2470; A-9833; NAS 1.60:2470; AVSCOM-TR-84-A-5) Avail: NTIS HC A03/MF A01 CSCL 20K

Nonlinear beam kinematics are developed and applied to the dynamic analysis of a pretwisted, rotating beam element. The common practice of assuming moderate rotations caused by structural deformation in geometric nonlinear analyses of rotating beams was abandoned in the present analysis. The kinematic relations that described the orientation of the cross section during deformation are simplified by systematically ignoring the extensional strain compared to unity in those relations. Open cross section effects such as warping rigidity and dynamics are ignored, but other influences of warp are retained. The beam cross section is not allowed to deform in its own plane. Various means of implementation are discussed, including a finite element formulation. Numerical results obtained for nonlinear static problems show remarkable agreement with experiment. R.J.F.

N85-27259*# Kentucky Univ., Lexington.
IN PLANE STRESS ANALYSIS
O. W. Dillon, Jr. 1 May 1985 16 p refs Prepared for JPL
(Contract JPL-956571)
(NASA-CR-175775; DOE/JPL-9565711-85/02; NAS 1.26:175775) Avail: NTIS HC A02/MF A01 CSCL 20K

An investigation of the blowing up of UK numerical results for the inplane stress calculations for silicon ribbon is presented. The inplane stress that exists in a thin plate is governed by two general equations of equilibrium and compatibility. G.L.C.

N85-27260*# Akron Univ., Ohio. Dept. of Civil Engineering.
SOME ADVANCES IN EXPERIMENTATION SUPPORTING DEVELOPMENT OF VISCOPLASTIC CONSTITUTIVE MODELS Final Report
J. R. Ellis and D. N. Robinson May 1985 62 p refs
(Grant NAG3-379; Contract W-7405-eng-26)
(NASA-CR-174855; NAS 1.26:174855) Avail: NTIS HC A04/MF A01 CSCL 20K

The development of a biaxial extensometer capable of measuring axial, torsion, and diametral strains to near-microstrain resolution at elevated temperatures is discussed. An instrument with this capability was needed to provide experimental support to the development of viscoplastic constitutive models. The advantages gained when torsional loading is used to investigate inelastic material response at elevated temperatures are highlighted. The development of the biaxial extensometer was conducted in two stages. The first involved a series of bench calibration experiments performed at room temperature. The second stage involved a series of in-place calibration experiments conducted at room and elevated temperature. A review of the calibration data indicated that all performance requirements regarding resolution, range, stability, and crosstalk had been met by the subject instrument over the temperature range of interest, 21 C to 651 C. The scope of the in-place calibration experiments was expanded to investigate the feasibility of generating stress relaxation data under torsional loading. B.W.

N85-27261*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
COMPONENT-SPECIFIC MODELING Annual Status Report
R. L. McKnight 1984 115 p
(Contract NAS3-23687)

(NASA-CR-174765; NAS 1.26:174765; ASR-1) Avail: NTIS HC A06/MF A01 CSCL 20K

A series of interdisciplinary modeling and analysis techniques that were specialized to address three specific hot section components are presented. These techniques will incorporate data as well as theoretical methods from many diverse areas including cycle and performance analysis, heat transfer analysis, linear and nonlinear stress analysis, and mission analysis. Building on the proven techniques already available in these fields, the new methods developed will be integrated into computer codes to provide an accurate, efficient and unified approach to analyzing combustor burner liners, hollow air-cooled turbine blades and air-cooled turbine vanes. For these components, the methods developed will predict temperature, deformation, stress and strain histories throughout a complete flight mission. Author

N85-27262*# Eloret Corp., Sunnyvale, Calif.
SIMULATION STUDIES FOR SURFACES AND MATERIALS STRENGTH Semiannual Progress Report, 1 Nov. 1984 - 30 Apr. 1985
Timur Halicioglu 30 Apr. 1985 56 p refs
(Contract NCC2-297)
(NASA-CR-175766; NAS 1.26:175766) Avail: NTIS HC A04/MF A01 CSCL 20K

From intermolecular force studies, it is now known that the overall non-additive contribution to the lattice enegy is positive so that analysis based on only pairwise additivity suggests a shallower intermolecular potential than the true value. Two body contributions alone are also known to be categorically unable to even qualitatively describe some configurations of molecular clusters in the gas phase or the general relaxation and reconstruction of fcc crystal surfaces. In addition, the many-body contribution was shown to play a key role in the stability of certain crystal structures. In these recent analyses, a relatively simple potential energy function (PEF), comprising only a two-body Mie-type potential plus a three-body Axilrod-Teller-type potential, was found to be extremely effective. This same parametric PEF is applied to describe the bulk stability and surface energy for the diamond cubic structure. To test the stability condition, the FCC, BCC, diamond cubic, graphite and beta-tin structures were considered. Author

N85-27263*# Connecticut Univ., Storrs. Dept. of Mechanical Engineering.
ELEVATED TEMPERATURE BIAXIAL FATIGUE Final Report, 15 Feb. 1981 - 31 Oct. 1984
Eric H. Jordan 31 Oct. 1984 167 p refs
(Grant NAG3-160)
(NASA-CR-175795; NAS 1.26:175795) Avail: NTIS HC A09/MF A01 CSCL 20K

A three year experimental program for studying elevated temperature biaxial fatigue of a nickel based alloy Hastelloy-X has been completed. A new high temperature fatigue test facility with unique capabilities has been developed. Effort was directed toward understanding multiaxial fatigue and correlating the experimental data to the existing theories of fatigue failure. The difficult task of predicting fatigue lives for non-proportional loading was used as an ultimate test for various life prediction methods being considered. The primary means of reaching improved undertanding were through several critical non-proportional loading experiments. It was discovered that the cracking mode switched from primarily cracking on the maximum shear planes at room temperature to cracking on the maximum normal strain planes at 649 C. Author

N85-27264*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A COMPUTER ANALYSIS PROGRAM FOR INTERFACING THERMAL AND STRUCTURAL CODES
Robert L. Thompson and Robert J. Maffeo (GE, Cincinnati) 1985 17 p refs Proposed for presentation at the Intern. Computers in Eng. Conf. and Exhibition, Boston, 4-8 Aug. 1985; sponsored by ASME
(NASA-TM-87021; E-2571; NAS 1.15:87021) Avail: NTIS HC A02/MF A01 CSCL 20K

A software package has been developed to transfer three-dimensional transient thermal information accurately, efficiently, and automatically from a heat transfer analysis code to a structural analysis code. The code is called three-dimensional TRansfer ANalysis Code to Interface Thermal and Structural codes, or 3D TRANCITS. TRANCITS has the capability to couple finite difference and finite element heat transfer analysis codes to linear and nonlinear finite element structural analysis codes. TRANCITS currently supports the output of SINDA and MARC heat transfer codes directly. It will also format the thermal data output directly so that it is compatible with the input requirements of the NASTRAN and MARC structural analysis codes. Other thermal and structural codes can be interfaced using the transfer module with the neutral heat transfer input file and the neutral temperature output file. The transfer module can handle different elemental mesh densities for the heat transfer analysis and the structural analysis. Author

N85-27265# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
INITIATION, GROWTH AND COALESCENCE OF SMALL FATIGUE CRACKS Annual Report, 15 Jan. 1983 - 14 Jan. 1984
A. F. Grandt, Jr. May 1984 63 p
(Grant AF-AFOSR-0041-82)
(AD-A151799; AFOSR-85-0064TR) Avail: NTIS HC A04/MF A01 CSCL 20/11

This interim report summarizes the second year's progress on a research effort directed at studying the initiation, growth, and coalescence of small fatigue cracks at notches. A fracture mechanics based model is described to predict the growth and coalescence of multiple cracks located at notches. The predictive model is compared with experimental results obtained with multiple cracked specimens made from a transparent polymer and for metal specimens. Current efforts and future goals are also briefly described. Author (GRA)

N85-27266# George Washington Univ., Washington, D.C. School of Engineering and Applied Science.
DETERMINATION OF FAILURE CHARACTERISTICS OF MATERIALS AND STRUCTURES Annual Summary Report, 1 Nov. 1983 - 31 Oct. 1984
H. Liebowitz 14 Dec. 1984 142 p
(Contract N00014-84-K-0027)
(AD-A152073) Avail: NTIS HC A07/MF A01 CSCL 20/11

The formulation for general three-dimensional small strain plasticity is presented. A finite element computer code has been developed to carry out the analysis. General hardening characteristics are included as an input option to the program allowing for the study of a wide class of materials. An example through crack problem is solved employing three different hardening assumptions (isotropic, kinematic and mixed). The plastic deformation in the region of the crack front predicted with each of the models is compared. While the predicted results are similar, several fundamental characteristics of each assumption can be observed. Residual deformation zones are also calculated as a measure of the extent of plastic deformation. The qualitative differences between hardening assumptions are consistent between the plasticity measures allowing for direct comparison with experimental observation. GRA

N85-27267# Akron Univ., Ohio. Inst. of Polymer Science.
AN IMPROVED TORSIONAL METHOD FOR DETERMINING THE FRACTURE TOUGHNESS OF STIFF MATERIALS AND OF ADHESIVE JOINTS
K. Cho and A. N. Gent Mar. 1985 23 p
(Contract N00014-76-C-0408)
(AD-A152091; TR-37) Avail: NTIS HC A02/MF A01 CSCL 20/11

A simple modification is described of the Outwater torsion test method for determining the fracture energy of stiff materials and of adhesive joints. It permits large torsions to be applied and the corresponding torque to be simultaneously monitored. The modified test method can be used with specimens of simple rectangular shape and having a wide range of stiffness. As an

example, the fracture energy is determined for molded rectangular bars of polystyrene having a wide range of thickness and of width. Author (GRA)

N85-27268# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE NONLINEAR ANALYSIS OF THICK COMPOSITE PLATES USING A CUBIC SPLINE FUNCTION Ph.D. Thesis
R. L. Hinrichsen Sep. 1984 157 p
(AD-A152115; AD-E401303; AFIT/DS/AE/84-2) Avail: NTIS HC A08/MF A01 CSCL 12/1

A non-linear thick composite shell theory is presented in which the through-the-thickness displacements are modeled using a variation of a cubic spline. The theory is developed by considering the Lagrangian strains in conjunction with the 2nd Piola-Kirchhoff stress. This formulation leads to a theory which encompasses large displacements with moderately large rotations but is restricted to small strains. The imposition of the cubic distribution through-the-thickness insures that the compatibility of the displacements and their first and second derivatives and thus the shear strains are maintained from lamina to lamina. The cubic distribution is seen as a higher order approximation than has been previously employed, but because of the nature of the spline, the theory is less cumbersome and more easily implemented than the parabolic theory. In addition, there is no introduction of additional degrees of freedom with the cubic theory. A family of 2-D isoparametric elements is employed in conjunction with the theory to solve a class of 3-D thick plate problems. Results are presented showing comparisons which are in good agreement with previous work. Author (GRA)

N85-27269# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
PREDICTING FULLY PLASTIC MODE 2 CRACK GROWTH FROM AN ASYMMETRIC DEFECT
F. A. McClintock and A. H. Slocum 28 Feb. 1985 34 p
(Contract N00014-82-K-0025)
(AD-A152227) Avail: NTIS HC A03/MF A01 CSCL 20/11

Asymmetrically cracked specimens fail with considerably less ductility than symmetrically cracked ones, due to the crack progressing along a shear band into pre-damaged material. A formulation for the accumulation of damage ahead of an asymmetic crack is presented, based on strain increments following a power law relation. These results are integrated both numerically and approximately. The crack growth per unit displacement increases approximately as the logarithm of the total crack advance per inclusion spacing, and varies inversely as the critical fracture strain. This provides a basis for predicting large-scale, fully plastic fracture from asymmetric weld defects using small-scale laboratory specimens. GRA

N85-27270# Ballistic Research Labs., Aberdeen Proving Ground, Md.
NUMERICAL RESOLUTION CALCULATION FOR ELASTIC-PLASTIC IMPACT PROBLEMS Final Report
B. M. Creighton Dec. 1984 73 p
(DA Proj. 1L1-62618-AH-80)
(AD-A152292; AD-F300591; BRL-MR-3418) Avail: NTIS HC A04/MF A01 CSCL 12/1

This paper is a brief summary of an investigation using the finite element method in the study of wave propagation and impact problems in solid materials. Guidelines are provided for the determination of the computational grid and the shape and size of the elements. Two examples are presented to show effects of mesh refinements on solution accuracy. Problems concerning the effects of artificial viscosity, as well as pressure and strain changes in the orientation of the grid, are presented. This study was performed with EPIC-2, a computer code for elastic-plastic impact calculations in two dimensions. EPIC-2 makes use of triangular elements in several configurations. The results presented herein should serve as a guide to proper selection of mesh size and orientation for accurate representation of physical problems. GRA

N85-27271# Los Alamos Scientific Lab., N. Mex. Geophysics Group.
MECHANICAL PROPERTIES OF LUNAR MATERIALS UNDER ANHYDROUS, HARD VACUUM CONDITIONS: APPLICATIONS OF LUNAR GLASS STRUCTURAL COMPONENTS
James D. Blacic 1984 24 p refs Presented at Lunar Bases and Space Activities of the 21st Century, Washington, D.C., 29-31 Oct. 1984
(Contract W-7405-eng-36)
(DE85-006682; LA-UR-85-363; CONF-8410230-9) Avail: NTIS HC A02/MF A01

Lunar materials and derivatives such as glass may possess very high tensile strengths compared to equivalent materials on Earth because of the absence of hydrolytic weakening processes on the moon and in the hard vacuum of free space. Hydrolyzation of Si-O bonds at crack tips or dislocations reduces the strength of silicates by about an order of magnitude in Earth environments. However, lunar materials are extremely anhydrous and hydrolytic weakening will be suppressed in free space. The geomechanical properties of the Moon and engineering properties of lunar silicate materials in space environments will be very different than equivalent materials under Earth conditions where the action of water cannot be conveniently avoided. Possible substitution of lunar glass for structural metals in a variety of space engineering applications enhances the economic utilization of the Moon. DOE

N85-27272# Sandia Labs., Albuquerque, N. Mex.
ACCURACY OF THE CALCULATED STRESS FIELD AROUND A CRAZE
W. E. Warren, A. Chudnovsky (Case Western Reserve Univ., Cleveland, Ohio), and R. L. Mullen (Case Western Reserve Univ., Cleveland, Ohio) 1985 5 p refs Presented at the 6th Intern. Conf. on Deformation, Yield and Fracture of Polymers, Cambridge, Eng., 1 Apr. 1985
(Contract DE-AC04-76DP-00789)
(DE85-005520; SAND-84-0021C; CONF-850493-1) Avail: NTIS HC A02/MF A01

Several recent calculations of the stress field around crazes in glassy polymers were based upon experimentally obtained craze opening displacements. While various techniques for performing these calculations were presented (i.e., Fourier transform, boundary integral and finite element methods), all are based on the solution of the same ill posed boundary value problem. Specific boundary conditions required to calculate the stresses around a craze lead to a large change in the stress field with small changes in the craze profile which are within the reported experimental tolerance. E.A.K.

N85-27273# Sandia Labs., Albuquerque, N. Mex. Applied Mechanics Div.
ON THE ACCURATE REPRESENTATION OF LARGE STRAIN NON-PROPORTIONAL PLASTIC FLOW IN DUCTILE MATERIALS
Raymond D. Krieg and Samuel W. Key (RE/SPEC Inc.) 1984 15 p refs Presented at the ASME Winter Ann. Meeting, Symp. on Constitutive Equations: Micro, Macro and Computational Aspects, New Orleans, 12-14 Dec. 1984
(Contract DE-AC04-76DP-00789)
(DE85-007106; SAND-84-1143C; CONF-841201-29) Avail: NTIS HC A02/MF A01

The plastic work W sub p or effective plastic strain epsilon sub p is often used as an independent variable in isotopic hardening plasticity to define a plastic hardening modulus H(epsilon sub p) or anti H(W sub p). For kinematic hardening behavior, the scalar eta = (ALPHA) xi/kappa, which is the inner product between the current center of the loading surface (ALPHA) and the loading surface gradient xi normalized with the radius of the loading surface kappa, is a more meaningful parameter. A plasticity model is defined with the usual isotopic hardening H sub kappa (epsilon sub p) plus an additional kinematic hardening H sub (ALPHA)/(eta). An exponential form of H sub (ALPHA)/(eta) is suggested and the behavior of the resulting model including an isotropic term is shown.

The behavior is very similar to the two surface plasticity models. It shows no cross effect hardening, a gentle knee in the stress-strain curve and a realistic Bauschinger effect. A numerical solution procedure has been developed for this model which is accurate, trouble free, and is reasonably economical. DOE

N85-27274# Pennsylvania State Univ., University Park. Materials Research Lab.

AN X-RAY STUDY OF RESIDUAL STRESSES IN NARROW GROOVE TIG WELDMENTS Final Technical Report, Sep. 1979 - Mar. 1984

Clay Olaf Ruud, Robert N. Pangborn, and Daniel J. Snoha Jan. 1985 174 p refs

(Contract DE-AC05-79ET-13591)

(DE85-006485; DOE/ET-13591/1) Avail: NTIS HC A08/MF A01

The residual stresses measured in this project in the plane of the plate rolling surface, in the heat-affected zone, adjacent and in a direction normal to the weld fusion line, are greater than those in a direction parallel to the weld fusion line. This is in contradiction to the observation that in single-pass welds the parallel stresses are greater. The maximum residual stresses observed in the weldment studied were nearly or at the yield strength; this stress level is comparable with that shown in welds from thin plates, but no greater; and was at the weld fusion line, or toe, of the weld. A double peak in the plots of stresses normal to the weld line on traverses normal to the weld on the rolled surface of the original plate was attributed to hardenability variation caused by the thermal cycling during multi-pass welding. The stress field of the narrow groove weldment is less extensive than what was predicted for V groove. Stress relief due to cutting the weldment through a plane normal to the weld line caused relief as far as 40% of the plate thickness. DOE

N85-27275# California Univ., Livermore. Lawrence Livermore Lab.

HOPKINSON BAR SIMULATION USING DYNA2D

J. A. Smith and T. A. Glover 8 Jan. 1985 6 p refs Presented at 2nd Symp. on the Interaction of Non-Nucl. Munitions with Structures, Panama City, Fla., 15 Apr. 1985

(Contract W-7405-eng-48)

(DE85-006766; UCRL-92010; CONF-850466-4) Avail: NTIS HC A02/MF A01

A finite-element simulation of a Split Hopkinson's bar (Kolsky apparatus) technique involving mortar specimens is accomplished with DYNA2D, an explicity two-dimensional finite-element code. Calculations are compared with experimental results in a report on report dynamic response of concrete and concrete structures, and with analytic solutions of the appropriate wave propagation problem. DOE

N85-27276# Technical Research Centre of Finland, Espoo. Lab. of Structural Engineering.

DYNAMIC AND AEROELASTIC ACTION OF GUY CABLES Ph.D. Thesis

Tuomo Kaernae May 1984 94 p refs Sponsored by Broadcasting Company, Technical Research Centre of Finland, Finnish Foundation of Technology, Deutsche Akademischer Austauschdienst and Eemil Aaltonen Foundation

(VTT-18; ISBN-951-38-2005-X; ISSN-0358-5069) Avail: NTIS HC A05/MF A01

A complete mathematical model and simplified spring-mass model for linear three-dimensional dynamic analysis of guyed masts with the frequency response method and a substructure technique where frequency dependent springs and dashpots are substituted for the guys were derived. Examples of the dynamic and aeroelastic behavior of guys are computed in terms of complex dynamic stiffness. The crossover behavior of the natural frequencies is shown to exert significant effects on guy action. The dynamic sensitivity of a guy can be assessed using a single stiffness parameter which depends on gravity and wind load. The results show that the direction and intensity of the mean wind force have a marked influence on the dynamic behavior of light guys. The effects of icing on the aerodynamic stability of guys is discussed. Author (ESA)

N85-27277# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.

ON THE USE OF MARKER LOADS FOR FATIGUE CRACK GROWTH MEASUREMENTS

Bjoern Palmberg Nov. 1984 59 p refs

(Contract FMV-FlygFl-82223-81-158-25-001)

(FFA-TN-1984-52) Avail: NTIS HC A04/MF A01

Marker band detectability and marker load interaction effects of a method which uses a large number of constant amplitude load cycles with a relatively high load ratio, added to the normal fatigue loading, were investigated. The magnitude of the marker load cycles is based on the threshold stress intensity value. Aluminum alloy 2024-T3 and 7075-type forgings were subjected to constant amplitude loading and spectrum loading with 4 different load spectra. Detection by a low power optical stereo microscope is preferable to scanning electron microscopy. The best result is obtained for a maximum marker load of 70% of the maximum normal fatigue load. The scatter in crack growth rates and fatigue lives is very large and no evidence of interaction effects caused by the marker loads is recognized, except for tests with the standardized load sequence TWIST. Author (ESA)

N85-27278# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

AN APPROXIMATION TO THE PROBLEM OF A PIN-LOADED HOLE IN AN ORTHOTHROPIC PLATE

G. J. Spies Aug. 1983 26 p refs

(VTH-LR-386) Avail: NTIS HC A03/MF A01

A simplified solution to the problem of a pin-loaded hole using a sinusoidal load distribution and neglecting displacement conditions is given. The calculations are worked out in detail and lead to expressions simple enough for a pocket calculator. For materials that are not extremely anisotropic the results are acceptable approximations. Author (ESA)

N85-27279# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

THE APPLICATION OF BRILES RIVETS FOR MECHANICAL JOINTING OF ARAMID REINFORCED ALUMINUM LAMINATE (ARALL)

L. B. Vogelesang and C. G. Paalvast Jun. 1983 16 p refs

(VTH-LR-387) Avail: NTIS HC A02/MF A01

Lap joints in ARALL riveted with MS and BRILES countersunk rivets were compared. The BRILES rivets increase the static strength of ARALL lap joints by 4%. This increase is mainly caused by the larger shear bearing area compared to MS and NAS rivets. The BRILES rivets extend the fatigue life of ARALL lap joints by 50%. This increase is caused by the improved clamping and reduced fretting damage of the BRILES rivets. The low profile ring dome head of the BRILES rivet facilitates thin skin installation. Author (ESA)

N85-27280# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

MECHANICAL JOINTING IN ARAMID FIBER COMPOSITES: AN EXPERIMENTAL STUDY

C. A. M. deKoning and W. H. M. Dreumel Jan. 1983 17 p refs

(VTH-LR-371) Avail: NTIS HC A02/MF A01

Mechanical jointing of Aramid was compared with carbon fiber and aluminum laminates. The laminate composition for Aramid is not critical if 20% to 30% of the fibers are oriented at +or- 45 deg. For an optimized carbon fiber laminate 60% of the fibers have to be in the +or- 45 deg orientation. The bearing strength of Aramid laminates is in the same range as that of aluminum. Compared with joints in aluminum and carbon fiber composites, an optimized Aramid joint requires more rivets or bolts. However in spite of the low bearing strength of aramid composites a quite acceptable joint strength is obtained. The failure mode of mechanical joints in Aramid laminates is comparable to that of aluminum. In contrast to joints in carbon fiber laminates, Aramid joints still

carry a considerable load after failure even at large deformations. Author (ESA)

N85-27281# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
AN ANALYSIS FOR AXIALLY COMPRESSED ORTHOTROPIC SHELLS WITH A MULTIMODE IMPERFECTION REPRESENTATION
P. G. Vermeulen Mar. 1984 50 p refs Sponsored by Stichting Technische Wetenschappen
(VTH-LR-422) Avail: NTIS HC A03/MF A01

An analysis to calculate the buckling load of axially compressed orthotropic cylindrical shells is presented. The behavior of the shell is described by a Donnell-type theory. The initial imperfections are represented by a double Fourier series, which makes it possible to include any number of imperfection modes in the analysis. In the derivation, the comptability equation is satisfied exactly, while the equilibrium equation is satisfied approximately, by the Galerkin procedure. This results in a system of algabraic equations, which are solved iteratively with the multidimensional Newton-Raphson method. Author (ESA)

N85-27282# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
STRUCTURAL STABILITY AND BIFURCATION IN CONICAL FLOW FIELDS
P. G. Bakker Jun. 1984 64 p refs
(VTH-LR-424) Avail: NTIS HC A04/MF A01

The bifurcation properties of unstable singularities such as saddle-node, topological saddle, and topological node in conical flow fields were studied. The nonlinear flow equations are evaluated near conical stagnation points in order to obtain local solutions near these points. Effects of parameter variation on the qualitative structure of the flow patterns, including the disappearance or spontaneous generation of conical flow singularities are discussed. Author (ESA)

N85-27283# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
THE PRACTICAL AND THEORETICAL SIGNIFICANCE OF SMALL CRACKS: AN EVALUATION
J. Schijve Jun. 1984 23 p refs
(VTH-LR-432) Avail: NTIS HC A02/MF A01

Fatigue prediction methods for engineering problems are reviewed. Information on crack nucleation and the growth of small cracks is summarized. Similarity aspects involved in prediction methods are discussed. Author (ESA)

N85-27284*# Auburn Univ., Ala. Engineering Experiment Station.
STRESS ANALYSIS OF THE SPACE TELESCOPE FOCAL PLANE STRUCTURE JOINT Bimonthly Progress Report, 1 Mar. - 30 Apr. 1985
Winifred A. Foster, Jr. and W. Lee Shoemaker 20 May 1985 6 p refs
(Contract NAS8-36288)
(NASA-CR-175797; NAS 1.26:175797) Avail: NTIS HC A02/MF A01 CSCL 20K

Two major efforts were begun concerning the Space Telescope focal plane structure joint. The 3-D solid finite element modeling of the bipod flexure plate was carried out. Conceptual models were developed for the load transfer through the three major bolts to the flexure plate. The flexure plate drawings were reconstructed using DADAM for the purpose of developing a file from which the coordinates of any point on the flexure plate could be determined and also to locate the attachment points of the various components which connect with the flexure plate. For modeling convenience the CADAM drawing of the flexure plate has been divided into several regions which will be subdivided into finite elements using MSGMESH, which is a finite element mesh generator available with MSC/NASTRAN. In addition to the CADAM work on the flexure plate, an effort was also begun to develop computer aided drawings of the peripheral beam which will be used to assist in modeling the connection between it and the flexure plate. B.W.

N85-26863*# Failure Analysis Associates, Palo Alto, Calif.
A REVIEW OF FRACTURE MECHANICS LIFE TECHNOLOGY
Jerrell M. Thomas, P. M. Besuner, and D. O. Harris *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 5-19 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

N85-26883*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TECHNICAL OVERVIEW STRUCTURAL DYNAMICS Abstract Only
Larry Kiefling *In its* Advan. High Pressure O2/H2 Technol. Apr. 1985 p 261 (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

N85-26885*# Wyle Labs., Inc., Huntsville, Ala.
FLOW DYNAMIC ENVIRONMENT DATA BASE DEVELOPMENT FOR THE SSME
C. V. Sundaram *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 277-288 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

N85-26886*# Dayton Univ., Ohio. Research Inst.
TURBINE BLADE FRICTION DAMPING STUDY
Robert J. Dominic *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 289-317 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 13I

N85-26887*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NONLINEAR STRUCTURAL ANALYSIS FOR FIBER-REINFORCED SUPERALLOY TURBINE BLADES
D. A. Hopkins and C. C. Chamis *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 318-340 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

N85-26889*# Control Dynamics Co., Huntsville, Ala.
EFFECTS OF BEARING DEADBANDS ON BEARING LOADS AND ROTOR STABILITY
John R. Glaese and Angelia P. Bukley *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 345-365 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

N85-26891*# Mechanical Technology, Inc., Latham, N. Y.
DEVELOPMENT AND APPLICATION OF A UNIFIED BALANCING APPROACH WITH MULTIPLE CONSTRAINTS
Edward S. Zorzi, C. Chester Lee, and John C. Giordano *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol. Apr. 1985 p 381-399 refs (For primary document see N85-26862 16-20)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

N85-26895*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
VIBRATION CHARACTERISTICS OF THE HPOTP (HIGH PRESSURE OXYGEN TURBOPUMP) OF THE SSME (SPACE SHUTTLE MAIN ENGINE)
Dara W. Childs and David S. Moyer *In* NASA. Marshall Space Flight Center Advan. High Pressure O2/H2 Technol Apr. 1985 p 452-481 refs (For primary document see N85-26862 16-20)
(Contract NAS8-34505)
Avail: NTIS HC A99/MF E03; SOD HC CSCL 20K

N85-27065# Joint Publications Research Service, Arlington, Va.
STABILITY OF ANISOTROPIC CYLINDRICAL SANDWICH SHELLS Abstract Only

I. Yu. Babich, A. N. Guz, and L. V. Denglazov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 66 Transl. into ENGLISH from Prikl. Mekh. (Kiev), no. 9, Sep. 1983 p 14-20 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27066# Joint Publications Research Service, Arlington, Va.
STUDY OF OSCILLATIONS OF COMPOSITE CYLINDRICAL SHELLS USING A DYNAMIC STIFFNESS TECHNIQUE Abstract Only
N. S. Kondrashov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 67-68 Transl. into ENGLISH from Prikl. Mekh. (Kiev), no. 9, Sep. 1983 p 38-44 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27067# Joint Publications Research Service, Arlington, Va.
STRESSED-STRAINED STATE OF TUBULAR SHELLS UNDER UNIFORMLY DISTRIBUTED PRESSURE Abstract Only
Ya. M. Grigorenko, V. I. Gulyayev, Ye. A. Gotsulyak, and K. Ashuri *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 71 Transl. into ENGLISH from Prikl. Mekh. (Kiev), v. 19, no. 8, Aug. 1983 p 11-18 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27068# Joint Publications Research Service, Arlington, Va.
RESEARCH IN THE FIELD OF RIB STIFFENED SHELL STABILITY Abstract Only
I. Ya. Amiro and V. A. Zarutskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 72 Transl. into ENGLISH from Prikl. Mekh. (Kiev), no. 11, Nov. 1983 p 3-20 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27069# Joint Publications Research Service, Arlington, Va.
STRESSED STATE OF MULTILAYER THICK-WALLED LONGITUDINALLY CORRUGATED CYLINDERS Abstract Only
Yu. N. Nemish and Yu. I. Matyash *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 73 Transl. into ENGLISH from Prikl. Mekh. (Kiev), no. 11, Nov. 1983 p 52-58 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

42 GEOSCIENCES (GENERAL)

N85-27285*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TOPEX GRAVITY MODEL DEVELOPMENT TEAM ACTIVITIES DURING FISCAL YEAR 1984
James G. Marsh, ed. and George H. Born, ed. Apr. 1985 318 p refs Submitted for publication
(NASA-TM-86208; NAS 1.15:86208) Avail: NTIS HC A14/MF A01 CSCL 08B

Data base development, satellite physical characteristics and selection criteria, and a formula for predicting satellite radial orbit error due to geopotential errors are considered. A technique for optimally combining various tracking data types, work on an atmospheric density model, potential numerical integration problems, development of station coordinates, and refinement of the Earth orientation model are also covered. For individual titles, see N85-27286 through N85-27299.

N85-27286*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STATUS OF THE OBSERVATIONAL DATA SETS c46
S. M. Klosko and F. J. Lerch *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 66 p refs (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 08B

Existing satellite tracking and terrestrial gravity data sets must be evaluated and some manageable framework developed for selecting, qualifying, and processing those data which are deemed most important in creating a TOPEX gravity field containing from 1300 to 2500 individual items. Data from the minitrack system, optical observations, electronic (radar) observations, satellite laser ranging, satellite radar altimetry, satellite-to-satellite tracking, local terrestrial surface gravity anomaly surveys, and lumped harmonic constraints are examined for quality and quantity. Other data in these sets which were not previously analyzed for gravity modeling usefulness and preprocessing techniques which may be used to improve the overall precision of these data are discussed. A.R.H.

N85-27287*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE PHYSICAL AND ORBITAL CHARACTERISTICS c18
S. M. Klosko *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 17 refs (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 22B

Perhaps sixty satellites received sufficient tracking to warrant their consideration for inclusion in the current gravity field development activities underway for TOPEX. These objects vary in size, shape, and in their orbital history -- and in the information available concerning any and all of these characteristics. An attempt to obtain initial information on the satellite physical characteristics and the overall size of nongravitational perturbations for each of the satellites under consideration. Atmospheric drag perturbations were modeled and a solution for zonal harmonics was made. Calibrated area-to-mass ratios and estimates of nonconservative force accelerations are tabulated. A.R.H.

N85-27288*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE SELECTION CRITERIA c18
S. M. Klosko, F. J. Lerch, C. A. Wagner, and O. L. Colombo *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 9 p (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 22B

An attempt is made to give relative weight to the factors which influence the selection of satellites for inclusion in the gravity modeling problem associated with TOPEX. This scheme gives both credits and demerits in this process and does so in a relative sense stressing characteristics which are most important while factoring in the major problems associated with some satellites. Selection factors include a data value assessment, uniqueness of orbital characteristics, satellite similarity to TOPEX sensitivities, apsidal coverage, nonconservative force influences, and sensitivity to the anomalous field. M.G.

N85-27289*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GRAVITY MODEL DEVELOPMENT SOFTWARE STATUS c61
Barbara H. Putney *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 10 p (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 09B

The purpose of the GEODYN orbit determination and parameter estimation, the SOLVE and ERODYN computer software is to recover geodetic and geophysical parameters from satellite and other data in the most operationally efficient and state-of-the-art manner. Current software usage and development is described and activities of the Goddard TOPEX gravity model operations group are summarized. M.G.

N85-27290*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OPTICAL BEST ARC RMS TEST RESULTS c13
Theodore L. Felsentreger *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 9 p (For primary document see N85-27285 16-42)

Avail: NTIS HC A14/MF A01 CSCL 22A

The performance of the GEM-L2 Earth gravity model in converging several arcs of optical satellite tracking data was evaluated. The resulting root mean square (RMS) values for the arcs are compared with those obtained by using the GEM-9 and GEM-10B gravity models. The intention is to acquire additional data to be used in selecting a starting gravity model for the derivation of an adequate gravity model for TOPEX. In addition, test runs of the GEODYN program were performed using two different models to represent the coefficient of drag. Finally, satellite position and velocity vectors were obtained for arcs of optical data. M.G.

N85-27291*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

OCEAN TIDE MODELS FOR TOPEX ANALYSIS c48

Demos Christodoulidis, Ronald Estes, Douglas Chinn, and Ronald G. Williamson *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 33 p refs (For primary document see N85-27285 16-42)

Avail: NTIS HC A14/MF A01 CSCL 08C

Spherical harmonic expansions were produced for the available ocean tide constituent models. Admittance functions were computed for the models with equilibrium tide input. Ocean tide constituent expansion coefficient values were developed, including error bounds, for a wide spectrum of frequencies based on interpolation/extrapolation from functions based on available numerical models. M.G.

N85-27292*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

RADIAL ORBIT ERROR SPECTRUM FOR TOPEX c46

Carl A. Wagner *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 70 p refs (For primary document see N85-27285 16-42)

Avail: NTIS HC A14/MF A01 CSCL 08B

Simulations show that the detailed spectrum of radial orbit error is poorly determined from just crossover data, due to the peculiarities of crossover sampling; however, the power of the global average of crossover residuals may be well determined from the geopotential error matrix. A formulation is given for predicting satellite radial error due to geopotential errors. An approach to a global prediction of altimetric satellite crossover residuals from the covariance matrix of a gravitational solution is outlined. Radial variations of a near circular satellite orbit due to gravitational errors are considered with implications for satellite altimetry. A.R.H.

N85-27293*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE SIZE OF A GRAVITATIONAL FIELD MODEL FOR TOPEX c46

Oscar L. Colombo *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 9 p (For primary document see N85-27285 16-42)

Avail: NTIS HC A14/MF A01 CSCL 08B

The radial accuracy of the ephemeris of TOPEX depends, to a large extent, on that of the potential coefficients of the gravitational field model used to compute the orbit. Only better estimates of coefficients up to degree 36 may be needed, because the effect of higher degree ones are unlikely to affect the orbit significantly. To estimate the coefficients below degree 36 one must use many measurements that contain substantial information on the field well above the degree; unless smoothed out, this extra information may become aliased in the estimated coefficients to an unacceptable level. M.G.

N85-27294*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE SELECTION OF THE STARTING FIELD: GENERAL VERSUS TAILORED MODEL c46

F. S. Lerch, C. A. Wagner, O. L. Colombo, S. M. Klosko, and R. G. Williamson *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 11 p (For primary document see N85-27285 16-42)

Avail: NTIS HC A14/MF A01 CSCL 08B

The E-mats (normal equations) were solved for both the methods of the tailor-made a priori model and the general a priori model. Errors in the solutions of the 21 geopotential coefficients were plotted for comparison of the two methods. An ideal Topex accuracy goal of 1/4 the errors in the GEM-9 model (1/4 GEM-9 sigma's) was also plotted as a significance level to compare the differences in the solution of the two methods. Both cases of simulation with noise on the data and without noise were plotted. The following additional information were plotted in Figure 1: (1) the general a priori starting values (GEM9 + or - 3 sigma), (2) the standard deviations (error estimate) of the recovered coefficients for the case where noise was applied to the data, and (3) the Topex accuracy goal of 1/4 GEM-9 error sigma's for comparison. A log scale was used since over 6 orders of magnitude are seen in the plots. G.L.C.

N85-27295*# Texas Univ., Austin. Center for Space Research.

COMPARISON OF GRAVITY FIELD SOLUTION TECHNIQUES c46

In NASA. Goddard Space Flight Center Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 6 p (For primary document see N85-27285 16-42)

(Contract JPL-956689)

Avail: NTIS HC A14/MF A01 CSCL 08B

A 180-day arc of simulated Lageos range data (5 cm noise) is used to recover a (7 x 7) gravity field (J sub 4 through J sub 7, with C sub 21 and S sub 21 kept fixed). Results from both the long-arc and the short-arc approaches including the accuracy of the estimated gravity coefficients are compared. Figure 1 shows the ground-track distribution of the simulated 180-day arc of Lageos range data. The data sampling and distribution of these measurements are based on an actual tracking history. In the long-arc approach, a 180-day continuous orbit is used to estimate the (7 x 7) gravity field. The short-arc approach used twelve 15-day individual arcs with the (7 x 7) gravity field as common parameters. G.L.C.

N85-27296*# Texas Univ., Austin. Center for Space Research.

OPTIMAL RELATIVE DATA WEIGHTS c46

In NASA. Goddard Space Flight Center Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 9 p refs (For primary document see N85-27285 16-42)

(Contract JPL-956689)

Avail: NTIS HC A14/MF A01 CSCL 08B

In many orbit determination problems, multiple measurement types, either from ground-based tracking networks or from the satellite itself, are available. For high-precision orbit determination, it is imperative that these various observation types be properly weighted relative to each other. This is particularly important in the simultaneous recovery of the satellite state vector and a large number of geodynamical parameters such as those of the gravity field. An optimal relative data weighting algorithm and its application to a simulation involving the recovery of state and geodynamical parameters are described. B.G.

N85-27297*# Texas Univ., Austin. Center for Space Research.

ATMOSPHERIC DENSITY MODEL c46

In NASA. Goddard Space Flight Center Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 17 p ref (For primary document see N85-27285 16-42)

(Contract JPL-956689)

Avail: NTIS HC A14/MF A01 CSCL 04A

The density correction model is indeed capable of removing drag errors due to the mismodeling of the density model. In this case, an exponential density model is used to fit the Jachia 1971 density model. However, due to nonlinearity feature of the density correction model, the estimation of the density parameters requires more iterations of the batch filter. The concept of density correction models should be investigated further and applied to orbit determination using real satellite tracking data. Author

N85-27298*# Texas Univ., Austin. Center for Space Research.
NUMERICAL INTEGRATION THROUGH FORCE DISCONTINUITIES: SOLAR RADIATION PRESSURE c92
In NASA. Goddard Space Flight Center Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 18 p (For primary document see N85-27285 16-42)
(Contract JPL-956689)
Avail: NTIS HC A14/MF A01 CSCL 03B

Solar radiation pressure is an important contributor to the orbital motion of a satellite, particularly over long periods of time. Two of the most significant problems associated with numerically integrating the equations of motion that include the effect of solar radiation pressure are: (1) properly defining the boundary of the shadow region, and (2) including the proper contribution of solar radiation pressure to the total force as the satellite passes from sunlight to total shadow. To illustrate the integration errors associated with these procedures, a set of initial conditions representing the Starlett satellite (altitude approximately 955 km) is used. The integrations which neglect to take any special action at the shadow boundaries may cause an unacceptable error growth, even over a moderate number of revolutions. This error may be reduced sustantially by using the modification of back differences (mbd) method. B.G.

N85-27299*# Texas Univ., Austin. Center for Space Research.
STATION COORDINATES AND EARTH ROTATION PARAMETERS FROM LAGEOS LASER RANGING c46
In NASA. Goddard Space Flight Center Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 21 p refs (For primary document see N85-27285 16-42)
(Contract JPL-956689)
Avail: NTIS HC A14/MF A01 CSCL 08B

Because accurate station coordinates and earth orientation determinations are important to the TOPEX mission success, the status of Lageos data analysis is reviewed. Satellite laser range (SLR) measurements to Lageos from May 1976 to January 1984 were used to compute Earth rotation parameters and a new global solution for the geocentric positions of 57 tracking station sites occupied during this interval. The station position determinations were part of a simultaneous solution for Lageos orbit elements in 15-day arcs and Earth rotation parameters in 3-day sub-arcs using residuals from a 7.7-year Lageos long arc (LLLA 8402). Systematic differences between the terrestrial reference frames implied by the new solution and by previous solutions computed at the University of Texas (UT) and at Goddard Space Flight Center (GSFC) are reviewed. The new solution resolves a 70 cm z-axis difference in the inferred geocenter location between the GSFC solution (SL5) and the previous UT station coordinate solution (LSC 8112). Author

N85-27300# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY
23 Apr. 1985 139 p refs Transl. into ENGLISH from various Chinese articles
(JPRS-CST-85-012) Avail: NTIS HC A07/MF A01

News items, abstracts, and scientific reports on aspects of science and technology including chemistry, computer applications, applied sciences, life sciences, electronics, optics, national developments, physiology, and radiology are covered. For individual titles, see N85-27301 through N85-27306.

N85-27301# Joint Publications Research Service, Arlington, Va.
FUJIAN FORGES AHEAD IN ELECTRONIC PRODUCTION c61
In its China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 49-53 refs Transl. into ENGLISH from Xinhua (Beijing, China), 19 Mar. 1985 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

In product design, use of the computer is certainly not limited to use in complicated scientific calculations, but is already used to aid design. Computer aided design (CAD) is an integration of computer aided analysis and computer aided drafting, together with interactive human-machine activity. At present, CAD is just being perfected, moving in the direction of computer aided manufacturing (CAM). Besides taking on the optimal comprehensive design, designs and data can be entered onto disks or punched tape, by which numerical controlled machines can be controlled, effecting unguided product machining. China's efforts to update their CAD software tools are discussed. B.G.

N85-27302# Joint Publications Research Service, Arlington, Va.
CHINA'S INTEGRATED CIRCUIT PRODUCTION c43
Pan Yujun *In its* China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 67-71 refs Transl. into ENGLISH from Renmin Ribao (Beijing, China), 22 Aug. 1984 p 3 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

Practical accomplishments in the aspects of oceanography discussed are transport of suspended silt, concentration distribution of chlorophyll-a; ocean thermal field; water depth; surface wind field, surface oil film; optical image processing technology; ocean wave characteristics; fishing by remote sensing; and monitoring of the ocean environments. B.G.

N85-27303# Joint Publications Research Service, Arlington, Va.
ORGANIZING GEOLOGICAL WORK TASKS FOR 1985 OUTLINED c46
Wen Jiabao *In its* China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 72-77 refs Transl. into ENGLISH from Zhongguo Dizhi (Beijing) no. 2, 13 Feb. 1985 p 1-4 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

Reforms in geological work systems are actively promoted to enliven the economy. Ways to more effectively employ the limited budget for geological exploration are discussed. B.S.

N85-27304# Joint Publications Research Service, Arlington, Va.
SYNTHETIC APERTURE SIDE-LOOKING RADAR IMAGE ADJUSTMENT c32
Yuan Huikun *In its* China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 82-86 refs Transl. into ENGLISH from Guanxue Xuebao (Shanghai), v. 4, no. 8, 1984 p 756-759 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

The cause of image geometry error of synthetic side-looking radar is introduced and the principle of wedge lens correction is analyzed. Wedge lenses are used to correct the image geometry error of the image of a side-looking radar which resulted in a more accurate radar image. Author

N85-27305# Joint Publications Research Service, Arlington, Va.
NEW IMAGE DEBLURRING METHOD DESCRIBED c74
Y. Guoguang and E. N. Leith *In its* China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 87-97 refs Transl. into ENGLISH from Guangxue Xuebao (Shanghai), no. 1, 1983 p 1-9 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

An incoherent image deblurring method was developed. A new deblurring function, which is easier to implement than an inverse filter, was employed. This function, when convoluted with a blurred image in the spatial domain, can result in a deblurred image. This system is applicable to both extended monochromatic and white light sources. Because of the use of incoherent light sources, it introduced some redundancy. As compared to a conventional coherent light system, this method significantly improves the signal to noise ratio of the output image. Theoretical analysis proved that this new deblurring function is the Fourier transform of the inverse filter function. Experimental results were also presented. Author

N85-27306# Joint Publications Research Service, Arlington, Va.
ASTROMETRIC METHOD ADVANCES ASTRONOMY, GEODESY c89
In its China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 98-99 refs Transl. into ENGLISH from Xinhua (Beijing), 27 Mar. 1985 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

Chinese astronomers have developed a method to determine the absolute positions of stars that can be used in both high and low latitudes. This method will enable China to manufacture the meridian circle, a device for working out star catalogs and astronomical refractional tables. The method is also applicable in measuring astronomical refraction, basic to geodetic surveying. B.G.

N85-27307# Joint Publications Research Service, Arlington, Va.
USSR REPORT: EARTH SCIENCES Abstracts Only
19 Apr. 1985 123 p Transl. into ENGLISH from various Russian articles
(JPRS-UES-85-005) Avail: NTIS HC A06/MF A01

Numerous topics relating to U.S.S.R. research in the areas of meteorology, oceanography, geophysics, and Arctic and Antarctic regions are discussed. Cloud seeding in the Moscow area, the greenhouse effect in Earth's primordial atmosphere, internal waves in layers of Earth's upper mantle, and regularities in recent changes in surface air temperature and atmospheric precipitation fields are among the topics discussed. For individual titles, see N85-27308 through N85-27316.

N85-27308# Joint Publications Research Service, Arlington, Va.
CLOUD-SEEDING FOR REGULATING PRECIPITATION IN MOSCOW AREA Abstract Only c47
N. Tsarapkin *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 1 Transl. into ENGLISH from Leninskoye Znamya (Moscow), 9 Dec. 1984 p 4 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

The seeding of clouds in the Moscow area, primarily for the control of snowfall, is discussed. It is noted that precipitation was greater than normal in the past few years. R.J.F.

N85-27309# Joint Publications Research Service, Arlington, Va.
LIGHTWEIGHT AEROLOGICAL RADIOSONDE MARZ Abstract Only c47
A. Lupenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 2 Transl. into ENGLISH from Gudok (Moscow), 18 Dec. 1984 p 4 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

A new, small aerological radiosonde called MARZ was tested not long ago in the Urals. This instrument will gradually replace older types which are veterans of flights into the atmosphere. The radiosonde is much lighter than its predecessors. Older sondes are based on tubes and powered by large batteries, each of which weights 640 grams. But the power source of the MARZ is only one-fifth to one-sixth as large. The overall weight is only 430 grams, i.e., it is lighter than a single battery of its older brother. The new radiosondes measure temperatures ranging from minus 80 to plus 50 degrees Celsius and relative air humidity ranging from 15 to 98 percent. Moreover, their flight ceiling was increased to 30 kilometers. The Gidrometpribor (hydrometeorological instrument) experimental plant in Sverdlovsk produced several tens of thousands of these radiosondes. Observations of the atmosphere with the aid of MARZ radiosondes make it possible to increase the reliability, accuracy and dependability and therefore the overall quality of weather forecasts. R.J.F.

N85-27310# Joint Publications Research Service, Arlington, Va.
GREENHOUSE EFFECT IN EARTH'S PRIMORDIAL ATMOSPHERE Abstract Only c47
K. Ya. Kondratyev, N. I. Moskalenko, and S. N. Parzhin *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 4 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 277, no. 2, Jul. 1984 p 339-342 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

An attempt is made to calculate the greenhouse effect in the Earth's primordial atmosphere. The period of formation of the primordial atmosphere was not very long; therefore, the greenhouse effect and mean global temperature of the surface of the planet are calculated for solar insolation about two-thirds of the present quantity. The mean planetary albedo was assumed equal to 0.2, since the soil was not heavily eroded at that time. Products of degassing of the Earth, which primarily formed the primordial atmosphere, were assumed to consist of 84.42% water vapor, 14.29% carbon dioxide, 1.06% methane, 0.23% nitrogen, 0.1% SO2+OCS. The Earth's cloud cover at that time was probably at an altitude of 20 to 30 km and was quite stable, consisting of H2SO4 droplets. A table presents surface temperatures of the planet as a function of assumed partial pressure of CO2. R.J.F.

N85-27311# Joint Publications Research Service, Arlington, Va.
REGULARITIES IN RECENT CHANGES IN SURFACE AIR TEMPERATURE AND ATMOSPHERE PRECIPITATION FIELDS Abstract Only c47
N. F. Kovyneva *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 4-5 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Ser. Geogr. (Moscow), no. 6, Nov. - Dec. 1984 p 29-39 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

The regularities and quantitative estimates presented are based on instrumental measurements during the last 100 years. During this period the mean annual surface temperature for the Northern Hemisphere varied in the range of plus or minus 0.5 C. The principal patterns of warming in the modern period are given. Changes in precipitation are noted. The results of temperature and precipitation changes are represented in a series of seasonal maps. R.J.F.

N85-27312# Joint Publications Research Service, Arlington, Va.
INTERNAL WAVES IN LAYERS OF EARTH'S UPPER MANTLE Abstract Only c46
R. M. Gadzhiyev and F. A. Kadirov *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 35 Transl. into ENGLISH from Izv. Nauk Azerb. SSR, Ser. Nauk o Zemle (Baku), no. 2, 1984 p 98-104 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

The amplitude of the vertical velocity component of a wave disturbance at a division boundary and free surface of a two-layer model of the upper mantle is determined for the case when the lower layer includes the main horizontal flow existing in a certain period of geological time. When there is horizontal flow in the lower layer of the two-layer model of the upper mantle, internal waves arise. Perceptible disturbances of the free surface are clearly manifested in a continental model. In the oceanic model, the free surface is very little disturbed, if at all. The length of the internal wave disturbing the free surface and its vertical velocity component are comparable with the lengths and amplitudes of waves at the Earth's surface observed in secondary leveling data. With fixed values of the ratio of viscosities of the layers and time of existence of the horizontal flow, long internal waves have great amplitude. Analysis of the computation results shows that in the ocean model internal waves creating perceptible disturbances do not develop at the Earth's surface. This is probably the major reason that the geological structure of the continents differs sharply from that of the oceans. R.J.F.

N85-27313# Joint Publications Research Service, Arlington, Va.
RESULTS OF SIMULTANEOUS MEASUREMENTS OF ABSORPTION AND POLARIZATION OF RADIO WAVES REFLECTED FROM IONOSPHERE Abstract Only c32
I. Khandovletov *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 99 Transl. into ENGLISH from Izv. Akad. Nauk Turkm. SSR: Ser. Fiz.-Tekhn., Khim. i Geol. Nauk (Ashkhabad), no. 4, 1984 p 37-43 Original language document was announced in IAA as A85-24073 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

A review of experimental data shows that the effective electron collision frequency in the lower ionosphere has a significant effect on the polarization of reflected radio waves; diurnal variations of absorption and polarization are statistically correlated. For a constant plasma frequency, an increase in absorption leads to an increase in the ratio of polarization-ellipse (PE) axes, and to a rotation of the PE major axis toward the east-west line (for an ordinary wave). The correlation coefficient of diurnal variations of

the absorption and polarization characteristics was found to equal 0.7, on the average. It is also shown that, during a solar eclipse, the PE axis ratio increases and the orientation of the PE major axis is unstable. I.A.A.

N85-27314# Joint Publications Research Service, Arlington, Va.
TURBOPAUSE AS SOURCE OF INTERNAL GRAVITY WAVES Abstract Only **c46**
Yu. Karadzhayev and A. Mukhametnazarova *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 100 Transl. into ENGLISH from Izv. Akad. Nauk Turkm. SSR, Ser. Fiz.-Tekhn., Khim. i Geol. Nauk (Ashkhabad), no. 5, 1984 p 32-36 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

Turbopause variations play an important role in processes transpiring in the upper ionosphere. Theoretical computations by O. N. Savina show that when semitransparent Es layers are present (with the development of turbulence) the turbopause can be a source of medium-scale internal gravity waves. Upon reaching the F region these waves affect the distribution of ionization, generating wave disturbances. The period of these medium-scale internal gravity waves and wavelength vary in the ranges: 5 to 90 min, 50 to 250 km (horizontally) and 50 to 120 km (vertically). The horizontal phase velocity has the property of dispersion and is equal to 100 to 200 m/sec; the vertical phase velocity is constant for all frequency components and under experimental conditions varies from 30 to 120 sec (most probable value 80 m/sec). The purpose was experimental confirmation of the Savina hypothesis. The experimental data used were records of the frequency parameters of the Es layer as a natural tracer of the middle-latitude turbopause synchronous samples of the critical frequency of the F2 region. R.J.F.

N85-27315# Joint Publications Research Service, Arlington, Va.
STUDY OF SPATIAL DISTRIBUTION OF AURORAS Abstract Only **c46**
Yu. K. Krakovetskiy, Yu. A. Nadubovich, L. N. Popov, and N. A. Shumilov *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 101 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 279, no. 3, Nov. 1984 p 580-582 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

Earlier publications contain data indicating a closeness of the coordinates of zones of anomalies in the spatial distribution of auroras and zones of anisotropy of physical properties of the crust and suggest that crustal structures exert an influence on formation of the spatial structure of auroras. This possibility was investigated in the example of the spatial structure of auroras in Noril'sk region. The Noril'sk region is characterized by the presence of regional and local magnetic anomalies caused by magnetization of the upper crust. Crustal structure near the observation point has considerable anisotropy of physical properties having anomalously increased conductivity in comparison with the surrounding rocks, giving rise to a first anomalous zone. A second zone of anomalous distribution of auroras coincides with transition from the Siberian Platform to the West Siberian Plate. This is evidence supporting the idea that anomalies in the spatial distribution of auroras coincide with zones of crustal anisotropy. R.J.F.

N85-27316# Joint Publications Research Service, Arlington, Va.
FULL SHADOW PHENOMENON IN EARTH'S UPPER ATMOSPHERE Abstract Only **c46**
A. G. Kolesnik and I. A. Golikov *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 101-102 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 279, no. 4, Dec. 1984 p 832-834 Original language document was announced in IAA as A85-20083 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

Owing to the noncoincidence of the geographic and geomagnetic poles the diurnal rotation of the Earth leads to the formation of a sickle-shaped complete-shadow (CS) region in the ionosphere where sources of ionization, excitation, and heating are absent during the entire polar night. The CS region is confined between the convection boundary and the boundary of the region which is not accessible to solar electromagnetic radiation. The present paper studies the nature of the CS phenomenon by performing calculations of electron density distribution in the F-region maximum in the Northern Hemisphere for the winter solstice in coordinates of local time and geographic latitude for 06 and 18 UT. Results confirm the existence of the sickle-shaped CS region, where electron density is reduced drastically. I.A.A.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N85-27317 Illinois Univ., Urbana.
REMOTE SENSING OF IRREGULARITIES IN THE EQUATORIAL IONOSPHERE USING THE RADIO SCINTILLATION TECHNIQUE Ph.D. Thesis
Steven John Franke 1984 275 p
Avail: Univ. Microfilms Order No. DA8502144

Experimental measurements of signal level fluctuations (scintillation) on VHF and microwave signals from two geostationary communications satellites are studied in detail. The signals were recorded at an equatorial location which is almost directly beneath the satellites. The scintillation is caused by refraction and diffraction of the signals by variations of the refractive index in the Flayer of the ionosphere. This study is directed toward using the observed multifrequency scintillation to remotely sense the characteristics of the ionospheric irregularities. This is done by considering both statistical and deterministic models for the scintillation producing irregularities. The models are combined with existing propagation theory using analytical and numerical simulation techniques in order to predict the spatial and temporal characteristics of the multifrequency scintilation. Comparison with the observations is used to verify the models. Geophysical implications of the results are discussed in light of what is known about equatorial irregularities from previous experimental and theoretical studies. Dissert. Abstr.

N85-27318*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CNPQ/INPE LANDSAT SYSTEM: REPORT OF ACTIVITIES FROM OCTOBER 1, 1983 TO SEPTEMBER 30, 1984
Jose Luiz deBarrosAguirre, Principal Investigator Oct. 1984 30 p Presented at the LANDSAT Ground Station Operators Working Group and LGWOWG Data Distribution and Marketing Working Group Meetings, Sao Jose dos Campos, Brazil, Oct. - Nov. 1984 Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E85-10097; NASA-CR-175612; NAS 1.26:175612;
INPE-3323-PRE/623) Avail: NTIS HC A03/MF A01 CSCL 02F

The status of Brazilian facilities for receiving, recording, processing, and distributing LANDSAT-generated products is presented. Price lists and the revised LANDSAT-4 and -5 coverage map are included. A.R.H.

N85-27319*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
NOISE CORRECTION ON LANDSAT IMAGES USING A SPLINE-LIKE ALGORITHM
Nandamudi Lankalapalli Vijaykumar, Principal Investigator and Luiz Alberto Vieira Dias Jan. 1985 8 p refs Presented at the 4th Plenary Meeting of SELPER (Remote Sensing Latinamerican Experts Soc.), Santiago de Chile, 12-16 Nov. 1984 Sponsored by NASA ERTS
(E85-10098; NASA-CR-175613; NAS 1.26:175613;
INPE-3386-PRE/657) Avail: NTIS HC A02/MF A01 CSCL 02F

Many applications using LANDSAT images face a dilemma: the user needs a certain scene (for example, a flooded region),

but that particular image may present interference or noise in form of horizontal stripes. During automatic analysis, this interference or noise may cause false readings of the region of interest. In order to minimize this interference or noise, many solutions are used, for instane, that of using the average (simple or weighted) values of the neighboring vertical points. In the case of high interference (more than one adjacent line lost) the method of averages may not suit the desired purpose. The solution proposed is to use a spline-like algorithm (weighted splines). This type of interpolation is simple to be computer implemented, fast, uses only four points in each interval, and eliminates the necessity of solving a linear equation system. In the normal mode of operation, the first and second derivatives of the solution function are continuous and determined by data points, as in cubic splines. It is possible, however, to impose the values of the first derivatives, in order to account for shapr boundaries, without increasing the computational effort. Some examples using the proposed method are also shown. Author

N85-27320*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

MODELING THE BACKSCATTERING AND TRANSMISSION PROPERTIES OF VEGETATION CANOPIES Final Report

C. T. Allen (Sandia National Lab., Albuquerque, N. Mex.) and F. T. Ulaby (Michigan Univ., Ann Arbor) Feb. 1984 357 p refs ERTS

(Contract NAS9-15421)

(E85-10099; NASA-CR-171864; NAS 1.26:171864; RSL-TR-360F) Avail: NTIS HC A16/MF A01 CSCL 02F

Experimental measurements of canopy attenuation at 10.2 GHz (X-band) for canopies of wheat and soybeans, experimental observations of the effect upon the microwave backscattering coefficient (sigma) of free water in a vegetation canopy, and experimental measurements of sigma (10.2 GHz, 50 deg, VV and VH polarization) of 30 agricultural fields over the growing season of each crop are discussed. The measurements of the canopy attenuation through wheat independently determined the attenuation resulting from the wheat heads and that from the stalks. An experiment conducted to simulate the effects of rain or dew on sigma showed that sigma increases by about 3 dB as a result of spraying a vegetation canopy with water. The temporal observations of sigma for the 30 agricultural fields (10 each of wheat, corn, and soybeans) indicated fields of the same crop type exhibits similar temporal patterns. Models previously reported were tested using these multitemporal sigma data, and a new model for each crop type was developed and tested. The new models proved to be superior to the previous ones. Author

N85-27321*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

STUDY OF THE URBAN EVOLUTION OF BRASILIA WITH THE USE OF LANDSAT DATA [ESTUDO DA EVOLUCAO URBANA DE BRASILIA ATRAVES DO USO DE DADOS LANDSAT]

Maria de Lourdes Neves deOliveira, Principal Investigator, Celini Foresti, Madalena Niero, and Elza Maria de Morais Franco Parreiras Oct. 1984 32 p refs In PORTUGUESE; ENGLISH summary Presented at the 15th Congr. Intern. de Fotogrametria e Sensoriamento Remoto, Rio de Janeiro, Jun. 1984 and at the 1st Congr. Brasil. de Defesa do Meio Ambiente, Rio de Janeiro, Jul. 1984 Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(E85-10101; NASA-CR-175830; NAS 1.26:175830; INPE-3322-RPE/468) Avail: NTIS HC A03/MF A01 CSCL 05B

The urban growth of Brasilia within the last ten years is analyzed with special emphasis on the utilization of remote sensing orbital data and automatic image processing. The urban spatial structure and the monitoring of its temporal changes were focused in a whole and dynamic way by the utilization of MSS-LANDSAT images for June 1973, 1978 and 1983. In order to aid data interpretation, a registration algorithm implemented at the Interactive Multispectral Image Analysis System (IMAGE-100) was utilized aiming at the overlap of multitemporal images. The utilization of suitable digital filters, combined with the images overlap, allowed a rapid identification of areas of possible urban growth and oriented the field work. The results obtained permitted an evaluation of the urban growth of Brasilia, taking as reference the proposed stated for the construction of the city. Author

N85-27322*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

MICROWAVE MODEL PREDICTION AND VERIFICATIONS FOR VEGETATED TERRAIN

Adrian K. Fung Jan. 1985 63 p refs ERTS

(Contract NAS9-15421)

(E85-10102; NASA-CR-171863; NAS 1.26:171863) Avail: NTIS HC A04/MF A01 CSCL 02F

To understand the scattering properties of a deciduous and a coniferous type vegetation scattering models were developed assuming either a disc type leaf or a needle type leaf. The major effort is to calculate the corresponding scattering phase functions and then each of the functions is used in a radiative transfer formulation to compute the scattering intensity and consequently the scattering coefficient. The radiative transfer formulation takes into account the irregular ground surface by including the rough soil surface in the boundary condition. Thus, the scattering model accounts for volume scattering inside the vegetation layer, the surface scattering from the ground and the interaction between scattering from the soil surface and the vegetation volume. The contribution to backscattering by each of the three scattering mechanisms is illustrated along with the effects of each layer or surface parameter. The major difference between the two types of vegetation is that when the incident wavelength is comparable to the size of the leaf there is a peak appearing in the mid angular region of the backscattering curve for the disc type leaf whereas it is a dip in the same region for a needle type leaf. M.G.

N85-27323# Hawaii Univ., Honolulu.

EFFECTS OF TEMPERATURE ON REMOTELY SENSED MAFIC MINERAL ABSORPTION FEATURES M.S. Thesis

Ted L. Roush May 1980 142 p refs

Avail: NTIS HC A07/MF A01

Presented are the results of a laboratory study concerning the effects of temperature on characteristic mafic mineral reflectance spectra. This study presents the first reflectance spectra obtained at sample temperatures well below room temperature and at elevated temperatures with thermal contamination removed. Characteristic absorption band intensities, widths, and positions are presented as a systematic function of sample temperature. The 1 micro m absorption band minimum remains unchanged over the temperature range of this study for all samples. However, the spectra of the pyroxenes show that the 2 micro m absorption band is temperature dependent. The orthopyroxene 2 micro m band minimum shifts to longer wavelengths, lower energies, while the clinopyroxene 2 micro m band minimum shifts to shorter wavelengths, higher energies, as temperature increases. The spectra of a basaltic-like assemblage show two distinct absorptions located near 2 micro m. B.W.

N85-27324*# Washington Univ., St. Louis, Mo. Dept. of Earth and Planetary Sciences.

SHUTTLE IMAGING RADAR-A (SIR-A) DATA ANALYSIS Final Report

R. E. Arvidson 30 Dec. 1983 25 p refs Prepared for JPL

(Contracts NAS7-100; JPL-956427)

(NASA-CR-175785; NAS 1.26:175785) Avail: NTIS HC A02/MF A01 CSCL 17I

The utility of shuttle imaging radar (SIR-A) data was evaluated in several geological and environmental contexts. For the Ozark Plateau of southern Missouri, SIR-A data were of little use in mapping structural features, because of generally uniform returns. For western Illinois, little was to be gained in terms of identifying land use categories by examining differences between overlapping passes. For southern Australia (Koonamore Station), information ion vegetation types that was not obtainable from LANDSAT MSS data alone was obtained. Specifically, high SIR-A returns in the

Australian site were found to correlate with locations where shrubs increase surface roughness appreciably. The Australian study site results demonstrate the synergy of acquiring spectral reflectance and radar data over the same location and time. Such data are especially important in that region, since grazing animals have substantially altered and are continuing to alter the distribution of shrublands, grasslands, and soil exposures. Periodic, synoptic acquisition of MSS and SAR data would be of use in monitoring the dynamics of land-cover change in this environment. A.R.H.

N85-27325*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SIMULTANEOUS EARTH OBSERVATIONS FROM 2 SATELLITES
Harry E. Montgomery Mar. 1985 7 p ref
(NASA-TM-86204; Rept-85B0288; NAS 1.15:86204) Avail: NTIS HC A02/MF A01 CSCL 05B

Simultaneous co-located observations from two different orbits lead to several advantages (i.e., cross calibration of sensors and a wider range of solar-zenith and sensor look angles). The question was asked how many times per year (on the average) do the sub-satellite points of two satellites simultaneously come within D kilometers of each other?. For the Space Station (altitude: 500 km, inclination: 28 deg) and a Sun synchronous satellite (altitude 705 km, inclination 98.21 deg) the answers are 16, 41 and 82 times per year for encounter distances D of 20, 50, and 100 km espectively. The relationship between encounters per year and distance D is linear. The answers were obtained in two ways: (1) a closed form statistical approach which led to a simple algebraic expression, and (2) a Monte Carlo type computer solution. The largest difference between the two solutions was less than 12%. Author

N85-27326 Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
SYSTEM OF INTERPRETATION OF REMOTE SENSING DATA WHEN HYDROCARBONS ARE PRESENT, VOLUME 2 M.S. Thesis [SISTEMATICA DE INTERPRETACAO DE DADOS DE SENSORIAMENTO REMOTO NA RECEPCAO DE HIDROCARBONETOS, VOLUME 2]
Fernando Pellon deMiranda Apr. 1984 178 p In PORTUGUESE
(INPE-3087-TDL/162-Vol-2) Avail: NTIS HC A09/MF A01

Data obtained through remote sensory imaging for the purpose of characterizing morphostructural anomalies considered as indicators of anomalies were noted. Based on these anomalies, important morphostructural trends were established in the region in areas with an east-north easterly and north-north westerly orientation. Based on a statistical analysis, six preferential directions (structural band configurations) were determined. These directions are correlated with the morphostructural anomalous trends. Transl. by B.G.

N85-27327# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DEVELOPMENT OF A GRAPHIC SYSTEM: EXAMPLE USING THE OUTLINE OF SYNOPTIC CHARTS [DESENVOLVIMENTO DE UM SISTEMA GRAFICO: UM EXEMPLO NO TRACADO DE CARTAS SINOTICAS]
Sergio Roberto Matiello Pellegrino and Jose Antonio Goncalves Pereira Oct. 1984 11 p refs In PORTUGUESE Presented at the 3rd Congr. Brasil. de Meteorol., Belo Horizonte, Brazil, 3-7 Dec. 1984
(INPE-3296-PRE/611) Avail: NTIS HC A02/MF A01

A system, SINOGRAFO, is described that was developed to trace synoptic charts based on the display of meteorological data for the Brazilian Institute of Space Research. SONOGRAFO was used to trace the contour of South America and international boundaries as part of the Mercator project. The charts show the distribution of meteorological conditions existing over a wide region at a given moment. Pheomena of wind, air pressure, temperature, humidity, past and present weather, cloud formations, and amount of precipitation are indicated on the charts. SINOGRAFO is easy and economical to use and results in the production of readable, uniform charts that can be duplicated. Transl. by B.G.

N85-27328# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SELPER (LATIN AMERICAN SOCIETY OF REMOTE SENSORY SPECIALISTS) [A SELPER NO BRASIL]
Nelson de Jesus Parada and Rene Antonio Novaes Oct. 1984 7 p In PORTUGUESE Submitted for publication
(INPE-3315-PRE/622) Avail: NTIS HC A02/MF A01

The 1984 annual review of the Latin American Society of Remote Sensory Specialists [SELPER] is presented. The history of the organization, its Brazilian national structure, its membership, aims, and accomplishments are discussed. B.G.

N85-27329# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FUNCTION OF REMOTE SENSING IN BRAZIL [O EMPREGO DE SENSORIAMENTO REMOTO NO BRASIL]
Nelson de Jesus Parada and Rene Antonio Novaes Oct. 1984 11 p In PORTUGUESE Submitted for publication
(INPE-3314-PRE/621) Avail: NTIS HC A02/MF A01

The 1984 annual review of the Latin American Society of Remote Sensing Specialists (SELPER) is presented. Emphasis is placed on the application of remote sensing to agriculture geology, image processing, horticulture, meteorology and oceanography, water resources, land use, development of sensory systems, geomorphology, and soil classification. The development of foreign programs involving remote sensing satellites also is discussed. Transl. by B.G.

N85-27330# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
SYMBIOSIS BETWEEN POSTGRADUATE TRAINING AND RESEARCH PROJECTS: A SUCCESSFUL EXPERIENCE [A SIMBIOSE ENTRE POS-GRADUACAO E PROJETOS DE PESQUISA: UMA EXPERIENCIA BEM SUCEDIDA]
Luiz Alberto Vieira Dias and Celso deRennaeSouza Aug. 1984 23 p ref In PORTUGUESE; In ENGLISH summary Presented at the 17th Congr. Nacl. de Informatica Que Realizar-se-a de 5-11 Nov. 1984, Riocentro, Rio de Janeiro Submitted for publication
(INPE-3216-PRE/569) Avail: NTIS HC A02/MF A01

The postgraduate training offered at the Institute of Space Research is described, and its applicability to ongoing research is appraised. The Institute of Space Research combines a high-level postgraduate program with a vigorous research program. Research is conducted in four areas: (1) artificial intelligence and linguistics; (2) development of applied software; (3) development of mathematical applications; and (4) image processing. E.A.K.

N85-27331# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DIFFUSION COEFFICIENTS FOR COASTAL WATER DETERMINED FROM AERIAL PHOTOGRAPHS
M. R. Stevenson and H. M. InostrozaV. Feb. 1985 11 p refs Presented at the 4th Reuniao da SELPER, Santiago de Chile, 12-16 Nov. 1984
(INPE-3413-PRE/679) Avail: NTIS HC A02/MF A01

The horizontal coefficient of mixing (diffusion coefficient) in the ocean is necessary for a large variety of coastal and marine environmental studies. Two coastal embayments along the southeastern coast of Brazil were studied. Rhodamine-B dye was dissolved in methanol and the solution was separated into three aliquots, each containing about 100 gm. of dye. During the experiment, an aircraft flew over the area and took a number of photographs with an RC-10 metric camera. From the film images it was possible to extract information on the areal changes of each dye patch. The data were used to construct dispersion diagrams. Using a least squares method, the diffusion coefficients for three dispersals were determined. The largest value corresponded to a bay more exposed to the sea, than the other two locations. The values, derived from aerial photographs, compared very well with previous determinations of K, based on conventional fluorometric methodology in a nearby area. It is suggested that it is possible to obtain reasonable estimates of diffusion from aerial photographs. E.A.K.

N85-27332# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE RELEVANCE OF REMOTE SENSING TO BRAZIL
Nelson de Jesus Parada Feb. 1985 29 p Submitted for publication
(INPE-3421-PRE/686) Avail: NTIS HC A03/MF A01

Satellite Remote Sensing has proved to be of great importance to both developing and developed countries. It helps forecasting crops, weather and climate, monitoring environmental changes and natural disasters, and gaining knowledge about renewable and nonrenewable resources, among many other applications. But, so that mankind may deeply profit from all this technology, it must be made accessible worldwide at an affordable cost. The Brazilian state of art in Satellite Remote Sensing is discussed including the Brazilian Remote Sensing Experiment on board of NASA's Space Shuttle, calling attention to the necessity of cooperation among nations with or without such technology. B.W.

N85-27333# Centre National d'Etudes Spatiales, Toulouse (France).
DATA COLLECTION AND PLATFORM LOCATION BY SATELLITE: ARGOS USERS' CONFERENCE
1983 364 p refs Partly in ENGLISH and FRENCH Conf. held at London, 27-28 Sep. 1983
Avail: NTIS HC A16/MF A01

Use of the ARGOS satellite data collection and platform location system in oceanography, meteorology, biology, seismology and hydrology was discussed. Maritime applications and ARGOS equipment were described. For individual titles, see N85-27334 through N85-27356.

N85-27334# Centre National d'Etudes Spatiales, Toulouse (France).
STUDIES INTO LOCATION ACCURACY
E. Guy Oyarcabel *In its* Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 21 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

The accuracy of location data from standard ARGOS platform transmitter terminals (PTT) and PTTs with improved oscillators was analyzed. Using two-pass location measurements made over a few days, it is shown that it is possible for PTTs containing good-quality oven-controlled crystal oscillators to attain absolute location accuracies of the order of 50 m. The results indicate that it is possible to locate PTTs situated in the same region with an accuracy of 10 to 20 m. Author (ESA)

N85-27335# Rijkswaterstaat, The Hague (Netherlands). Data Processing Div.
POSITIONING ACCURACY OF THE ARGOS SYSTEM IN OPERATIONAL USE
Jan Looyen *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 13 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

The positioning accuracy of the ARGOS system for an offshore buoy was assessed by statistical analysis of a large number of positionings. An area of reliability around the real position of the buoy was calculated to enable users to determine whether the buoy had broken loose. Over 80% of all observations fall within the 1 sigma bands around the mean value, against the 68% expected for a normal distribution. An analysis of the distribution of the positioning values with regard to the mean location shows that north-south (y) and east-west (x) components are independent. The standard deviation for x is 399 m, for y is 445 m. The standard deviation and mean value of distances derived for ARGOS are both 375 m. Author (ESA)

N85-27336# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
A PHASE MODULATION EVALUATION PROCEDURE FOR AN ARGOS TYPE SIGNAL **c32**
Nadov Levanon *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 22 p (For primary document see N85-27333 16-43)
(Contract N00024-83-C-5301)
Avail: NTIS HC A16/MF A01

A simple procedure which allows evaluation of the three phase-modulation levels of an ARGOS signal using only a spectrum analyzer is described. When symmetry is inherent and only the total span is adjustable, a staircase type modulating signal is suggested. When each level is adjusted separately, a square-wave type signal is suggested. Analytic expressions of the expected theoretical spectrums are given and plotted with measured spectrums. The correct modulation levels are identified by visual inspection of the spectrum display. Author (ESA)

N85-27337# Thorn EMI, Hayes (England). Sheer Water Working Dept.
DB2 AND DB3: THE NEXT GENERATION **c17**
P. A. Bedford *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 6 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

The application of satellite telemetry to the DB2 and 3 oceanographic/meteorological buoy project is described. The buoys acquire data for real time transmission and on-board recording. Each buoy has two duplicated and independant data processing packages on-board and each transmits to the ARGOS and METEOSAT Systems. The advantage of this highly redundant arrangement is the low probability of total data loss. Meteorological parameters are disseminated via the Global Telecommunication System to the UK Meteorological Office to be used as a data source for weather forecasting. Transmitted data are recorded at ARGOS and METEOSAT ground stations; these data are merged with that of the on-board recorders to produce the best possible data set. Author (ESA)

N85-27338# National Oceanic and Atmospheric Administration, Bay St. Louis, Miss.
DEVELOPMENT OF A LAGRANGIAN DRIFTING BUOY **c48**
E. G. Kerut and W. B. Wilson *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 7 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

The development of a well-calibrated Lagrangian drifting buoy system to measure surface currents in climate-related experiments in ocean basins to obtain a statistical description of surface ocean current dynamics is described. The development approach was based on a hull design to minimize the deleterious effects of wind and waves on a Lagrangian current tracker. Theoretical studies indicated a spheroid hull shape to have a high potential as a surface Lagrangian tracking device. A numerical computer model to simulate generic spheroid hull forms in a synthesized environment for Lagrangian effectiveness studies was developed and validated in laboratory tests for implementing preliminary system design studies. These studies were performed and recommendations for the design of a prototype Lagrangian drifting buoy system were made. Author (ESA)

N85-27339# Laboratoire de Meteorologie Dynamique du CNRS, Palaiseau (France).
LONG TERM DRIFTING FLOAT FOR MEASURING MEAN OCEANIC CIRCULATION USING ARGOS SYSTEM **c48**
J. C. Gascard (Laboratoire d'Oceanographie Physique), P. F. Jeannin (Laboratoire d'Oceanographie Physique), and H. Ovarlez *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 10 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

An expendable, 3 yr lifetime, glass float located via ARGOS was developed for ocean current mapping. The reliability of surface transmissions via TIROS-N satellite for location and for message reception was tested. Three floats were launched. Two were washed ashore after 1 week. The third remained offshore and lasted for 38 days. This float was located 8 times every day

on average, with an accuracy of 800 m. Fifteen messages were transmitted on average for each passage, lasting 10 min, with the float emitting every 40 sec. On average 12 messages are absolutely correct among the 15. Within the 32 bytes of the message, an error rate increasing from 1% on the first bytes collected to 3% or 4% on the last ones is found. Author (ESA)

N85-27340# Scottish Marine Biological Association, Edinburgh (Scotland). Marine Physics Dept.
ARGOS-TRACKED DRIFTERS IN THE ROCKALL TROUGH **c48**
David J. Meldrum, D. Booth, and D. Ritchie *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 14 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

A small, freely drifting satellite-tracked low-drag buoy, drogue and rigging system was designed, and was deployed in the Rockall Trough area of the Atlantic, known to possess a considerable thickness of possibly hydrocarbon-bearing sediments. The buoys are used to study horizontal surface current structure. A large anticyclonic gyre is detected. Author (ESA)

N85-27341# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway).
MONITORING OF MARINE ENVIRONMENT **c45**
Niels S. Nergaard *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 13 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

Marine environmental monitoring buoys are described. A drifting buoy with an ARGOS transmitter was deployed in the Southern Ocean and on Antarctic icebergs. A cement drifter was used for oil pollution simulations. A wave following moored buoy was developed. An iceberg monitoring capsule which can be deployed by parachute was built. Author (ESA)

N85-27342# Dundee Univ. (Scotland). Carnegie Lab. of Physics.
THE VALIDATION OF SEA SURFACE TEMPERATURES DETERMINED FROM AVHRR DATA USING IN SITU DATA RECOVERED VIA SYSTEM ARGOS
A. P. Cracknell, A. Cairnie, R. D. Callison, B. I. Johnston, D. E. Warren, D. J. Ellett (Scottish Marine Biological Association), and D. J. Meldrum (Scottish Marine Biological Association) *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 27 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

Sea surface temperature (SST) data transmitted from a moored buoy by an ARGOS platform, and calculated from thermal infrared scanner data obtained from the TIROS-N/NOAA-6, 7, and 8 polar orbiting satellites are compared. Estimated errors are 0.4 C for the ARGOS data, 0.12 C for the brightness temperature, and 0.5 C for the NOAA algorithms. The satellite brightness temperatures are lower than the measured SST, while split channel corrections are of the correct magnitude, and show good agreement with the buoy temperature. Author (ESA)

N85-27343# Centre National pour l'Exploitation des Oceans, Paris (France). Dept. d'Etudes Oceaniques.
WAVE DIRECTIONAL SPECTRA VIA ARGOS
D. Becq *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 12 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

A wave directional, satellite system buoy transmitting data via a radio link, enabling a detailed characterization of the sea was developed. A powerful microprocessor for computation and two low consumption ones monitoring the powerful one solve the autonomy problem. The use of two successives ARGOS messages for transmission of a complete and usable B spectrum overcomes the limitations imposed by the ARGOS System, which was chosen for its reliability. Tests prove the seaworthiness of the buoy, and its ability to resolve different wave propagation directions. Author (ESA)

N85-27344# Continental Shelf Inst., Trondheim (Norway).
ROUTINE WAVE AND METEOROLOGICAL MEASUREMENTS IN OFFSHORE AREAS USING ARGOS DATA SURVEILLANCE **c47**
S. F. Barstow, A. Lygre, and T. Audunson *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 28 p refs Sponsored by Norsk Hydro, Saga Petroleum, Statoil, British Petroleum, Philips Petroleum and IKU (For primary document see N85-27333 16-43)
(Contract NTNF-1810.7890)
Avail: NTIS HC A16/MF A01

Buoys which measure wave direction and meteorological parameters were deployed off Norway and the Ivory Coast. The ARGOS system is used for surveillance and near real time data control. The heave wave spectrum, and spectral and time series parameters are calculated on board. Results show good agreement with physical and geographical truths. The buoys show that they are able to withstand severe environmental conditions, from 20 m waves off Norway to the high temperatures in the tropical waters off the Ivory Coast. Author (ESA)

N85-27345# Institute of Oceanographic Sciences, Wormley (England).
RESULTS OF AN INITIAL TRIAL OF A SATELLITE TELEMETERING BUOY MEASURING NEAR SURFACE CURRENT **c17**
P. G. Collar and C. A. Hunter *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 8 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

A satellite telemetering drifting buoy which incorporates a vector averaging electromagnetic current meter for measuring near surface currents was tested. Results show that the characteristics of the ARGOS system are not easily matched to the efficient collection of an evenly sampled time series. The arrangement resulted at times in the transmission of much redundant data and in spite of this data were lost through uneven satellite coverage. Nevertheless the transmission of data is inexpensive compared with the cost of position location. For a drifter the advantage of using the transmission link rather than recording in-situ is that a data set can be accumulated even if the buoy is ultimately lost. Likewise the output of a moored system can be monitored continuously for correct operation and there is an additional advantage in that the position of the buoy is available in the event of loss of mooring integrity. Author (ESA)

N85-27346# Pretoria Univ. (South Africa). Mammal Research Inst.
MOTIVATION FOR SATELLITE TRACKING OF SOUTHERN ELEPHANT SEALS MIROUNGA LEONINA AT SEA
M. N. Bester *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 11 p refs Sponsored by South African Department of Transport (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

The lack of explanations for the decline in southern elephant seal numbers is underlined, and as predators entirely dependent on marine feeding, a study of their spatial and temporal distribution during their pelagic existence is proposed. The development of a transmitter subject to Service ARGOS specifications, and admittance to this system would be the only cost effective method to study the movement of elephant seals in the Southern Ocean. Author (ESA)

N85-27347*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. Marine Science Center.
THE ARGOS SYSTEM USED FOR TRACKING GRAY WHALES
Bruce R. Mate (Oregon State Univ., Newport), David Beaty (Telonics), Charles Hoisington, Richard Kutz, and Mary Lou Mate (Oregon State Univ., Newport) *In* CNES Data Collection and

Platform Location by Satellite: ARGOS Users' Conf. 1983 56 p refs Sponsored by Minerals Management Service, Anchorage and Office of Naval Research (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01 CSCL 05B

The development of satellite whale tags used to track gray whales in the eastern north Pacific Ocean is summarized. Two gray whales were radio-tagged in San Ignacio Lagoon (Mexico) and tracked on their northbound migration. One of the transmitters was modified to record and relay depth-of-dive information at 15 sec intervals throughout the course of the dive. Technical elements of data acquisition and analysis are outlined. The major biological findings are discussed. Author (ESA)

N85-27348# Office de la Recherche Scientifique et Technique, Bondy (France). Service Hydrologie.
PRESENT STAGE OF UTILIZATION OF THE ARGOS SYSTEM BY THE ORSTOM HYDROLOGICAL SERVICE FOR HYDROMETRIC DATA COLLECTION
G. Rabbia *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 6 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

Satellite telemetry utilization in hydrological studies in subtropical regions is described. Tests to inventory the possibilities applicable to hydrology (rainfall, water height level, flow gaging and flood forecasts); test and select equipment (catchers, coders, power supply); and estimate the cost for converting a standard station were performed with low orbiting and geostationary satellites. The data collection platforms used being of extremely reduced size made possible their installation in existing facilities without noticeable modifications. The data are especially interesting since users can register from 15% to 20% more daily readings with a 97% accuracy rate. Author (ESA)

N85-27349# National Dept. of Water and Electrical Energy, Brasilia (Brazil).
THE ARGOS SYSTEM IN BRAZIL
Paulo Roberto Martins Garcia *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 3 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

The use of satellite linked hydrology networks to study the day-to-day hydrological regime of the Amazon and its tributaries, to acquire data for fishing, agriculture, water transportation, management of dams and other facets of the river basin's economic development is discussed. Given the considerable problems of access in such a region, and the slow rate of change in water levels, the ARGOS System is suitable if there is no need to maintain or adjust clocks at the station. Experiments on two hydrological stations, and operation of a VHF direct readout station confirm the usefulness of ARGOS. Author (ESA)

N85-27350# Grenoble Univ. (France).
A SEISMIC ARGOS DATA COLLECTION PLATFORM
G. Poupinet and J.-P. Glot *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 6 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

A network of seismic event detectors transmitting data via ARGOS was installed in the Pyrenees and Mount Etna. Each ARGOS unit assumes precise GMT timing, transmission, and earthquake detection by a comparison between the seismic signal and a long term average. The Pyrenees network was compared with a standard seismological network. More than 80% of the automatic picks of earthquake P-arrivals are within 0.2 sec of those performed by an operator playing back magnetic tapes. The performance ARGOS for microearthquakes within the network are even better. The ease in the installation of the equipment in the field and in processing the data independently of the number of detectors offers the possibility to complement present seismological networks to improve the precision in locating earthquakes and to monitor seismicity on a long term in remote zones. Author (ESA)

N85-27351# Norwegian Meteorological Inst., Blindern.
AN OPERATIONAL BUOY NETWORK COLLECTING METEOROLOGICAL DATA c47
Carl Kolderup Jensen *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 11 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

The network of drifting buoys in Norwegian waters is described. Norwegian participation in the First GARP Global Experiment in the Southern Ocean (air pressure and sea surface temperature measurement) is outlined. The use of an ARGOS local user terminal for meteorological data is summarized. Positioning accuracy with ARGOS is treated. Author (ESA)

N85-27352# Royal Netherlands Meteorological Inst., De Bilt.
AVAILABILITY OF THE ARGOS SYSTEM BASED ON THE ORBITAL CHARACTERISTICS OF THE TIROS-N SATELLITES
Frank Grooters *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 16 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

The availability of NOAA-7 and 8 satellites for communicating with North Sea moored buoys was assessed, based on cyclic orbital frequencies, visibility periods spread over a number of days, and operational demands and data transmission limitations. Results are unfavorable to heliosynchronous satellites. Scientific utilization of a near polar orbiting satellite system is influenced by technical rather than time limitations, and offers a larger amount of data storage and processing capacity with simpler equipment.
Author (ESA)

N85-27353# Danish Meteorological Inst., Copenhagen.
OPERATIONAL EXPERIENCES WITH THE ARGOS SYSTEM IN GREENLAND
F. Jensen, K. Svanemsellem, and J. Taagholt (Technical Univ. of Denmark, Lyngby) *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 14 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

The Royal Danish Meteorological Institute agreed to maintain a minimum net of meteorological observation points in Greenland. This obligation is partly fulfilled by automatic observing stations. These stations are on remote locations and the most convenient method to communicate data is by METEOSAT and ARGOS data collecting systems. In the most northern part of Greenland geostationary satellites decline below the horizon and only ARGOS can be used. A ground station was established in Greenland to obtain real-time data from the ARGOS System. Problems related to operating ARGOS platforms in the Arctic are discussed.
Author (ESA)

N85-27354# Services Technique des Phares et Balises, Bonneuil-sur-Marne (France). Div. Etudes Technologiques.
CHECKING ON THE POSITION OF NAVIGATION MARKER BUOYS BY THE ARGOS SYSTEM
J. F. Racape *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 17 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

Equipment operational requirements led the French lighthouse, beacon, and navigation office to use ARGOS data collection and location facilities. A drifting criterion capable of generating an alert in the event of a drift of buoys fitted with ARGOS transmitters was derived from analysis of the system characteristics. The criterion made it possible to accurately identify two drifts and one buoy location error. The system allows operational monitoring of the equipment on buoys fitted with platforms. Author (ESA)

N85-27355# Centre National pour l'Exploitation des Oceans, Brest (France).
CONTRIBUTION OF THE NOAA-7 AND 8 AND ARGOS PARTNERSHIP TO WHITE TUNA FISHING IN THE NORTHEAST ATLANTIC

Jean-Yves Legall *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 8 p refs In FRENCH; ENGLISH summary (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

During the exploratory phase of fishing operations for white tuna in the NE Atlantic, an ARGOS keypad terminal was installed aboard the leading boat. Data transmitted on a daily basis give the meteorological/oceanographic parameters used to decide on starting dates and subsequent progression of fishing activities. Data relating to the daily catch is transmitted in order to analyze the fish catch/environment relationship from a hydroclimate point of view. Such ground data gives an opportunity to calibrate surface temperature maps emanating from data obtained by NOAA-7 and 8 satellites. Real time data covering the fish-catch/environment interface are used for the construction of a predictive model of white tuna fishing. Author (ESA)

N85-27356# Department of Transport, Pretoria (South Africa). South African Weather Bureau.
DATA FROM BOC-YACHTS: A SIGNIFICANT INPUT TO SOUTHERN HEMISPHERE ANALYSIS c47
P. LeRoux *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 9 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

Automatic weather stations on racing yachts supplied atmospheric pressure and temperature data for the Southern Hemisphere numerical weather forecasting program (run twice daily) from areas not covered by other facilities. Author (ESA)

N85-27357# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
REPORTS ON CARTOGRAPHY AND GEODESY. SERIES 1: ORIGINAL REPORTS, NO. 94
1984 173 p refs In GERMAN; ENGLISH summary Original contains color illustrations
(ISSN-0469-4236) Avail: NTIS HC A08/MF A01

The use of the AP-120 B vector processor in cartographic raster data processing; the testing of scanner-assisted revision of a topographic map; and the realization of cartographic tasks on the multiprocessor system EGPA are outlined. The application of the SICAD-system to surveying management; the automatic engraving of map frames in the revision of a topographic map; and the application of interactive graphic systems in land consolidation are treated. A concept for map revision using digital image processing methods; and experience with raster and vector processing for the construction of thematic maps with boundary design are discussed. The status of computer aided mapping in hydrographic services is described. Contour line generalization using digital image processing methods; and the production of orthophotos by digital image processing techniques are presented. For individual titles, see N85-27358 through N85-27368.

N85-27358# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
USE OF VECTOR PROCESSORS IN CARTOGRAPHIC RASTER DATA PROCESSING, WITH SPECIAL REGARD TO THE AP-120B VECTOR PROCESSOR [ZUM EINSATZ VON VEKTORPROZESSOREN IN DER KARTOGRAPHISCHEN RASTERDATENVERARBEITUNG UNTER BESONDERER BERUECKSICHTIGUNG DES AP-120B]
Uwe Buecher and Wigand Weber *In its* Repts. on Cartography and Geodesy. Ser. 1, No. 94 1984 p 7-55 refs In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

. The use of the vector processor AP-120B to shorten computing times in automation in raster cartography was studied. The AP is a pipeline processor. Since it is flexibly programmable, it can fulfill the requirements of cartographic raster data processing better than image processors. The AP forms part of a system with a host computer, magnetic disks, raster display screen and raster plotter. The data administration system for digital raster maps can also be used as a time saver when applying digital image processing in photogrammetry. Programs for the AP can be written with pipeline programming (assembler level) or vector programming (on a higher language level). Advantages and disadvantages of both programming types are discussed, and an example of the former is given. An increase in speed of 50 times that of the monoprocessor PDP 11/45 is achieved. Author (ESA)

N85-27359# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
TESTING OF SCANNER-ASSISTED REVISION OF THE TOPOGRAPHIC MAP 1:25,000 (TK 25) [VERSUCHE ZUR SCANNER-UTILIZATION FORTFUEHRUNG DER TOPOGRAPHISCHEN. KARTE 1:25,000 (TK 25)]
Bernhard Dresse *In its* Repts. on Cartography and Geodesy. Ser. 1, No. 94 1984 p 57-68 refs In GERMAN; ENGLISH summary Original contains color illustrations (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

A scanner-recorder system to speed up map revision using digital image processing methods was tested. The aim is to keep up to date existing official topographic maps, and to replace manual engraving. The scanning is performed with a resolution of 400 lines/cm. The generation of line signatures is described, and examples are shown. The use of the scale 1:10,000 for the design allows a quick plot and high precision. Author (ESA)

N85-27360# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
REALIZATION OF CARTOGRAPHIC TASKS ON THE MULTIPROCESSOR SYSTEM EGPA [REALISIERUNG VON AUFGABEN AUS DER KARTOGRAPHIE AUF DER MULTIPROZESSORANLAGE EGPA]
Matthias Goessmann, Jens Volkert, and Hans Zischler *In its* Repts. on Cartography and Geodesy. Ser. 1, No. 94 1984 p 69-77 refs In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

Utilization possibilities, behavior, and efficiency of the multiprocessor system Erlangen General Purpose Array (EGPA) in cartography were investigated. The hardware structure of the multiprocessor system, and the programming of the pilot-pyramid are described. Examples of image preprocessing and hatching of maps are given. It is shown that computer structures of the type EGPA allow substantial speeding up in image processing automatic cartography. Author (ESA)

N85-27361# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
APPLICATION OF THE SIEMANS COMPUTER AIDED COMPUTER (SICAD) SYSTEM TO THE SURVEYING MANAGEMENT IN BADEN-WUERTTEMBERG [ANWENDUNG DES SICAD-SYSTEMS BEI DER VERMESSUNGSVERWALTUNG IN BADEN-WUERTTEMBERG]
Walter Greiner *In its* Repts. on Cartography and Geodesy. Ser. 1, No. 94 1984 p 79-84 refs In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

The interactive graphic system Siemens Computer Aided Design (SICAD) was used to accelerate the renewal of cadastral plans. Hardware and software structure and data processing of the SICAD-system are described. Author (ESA)

N85-27362# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
AUTOMATIC ENGRAVING OF MAP FRAMES IN THE REVISION OF THE TK 25, 1:25,000 TOPOGRAPHICAL MAP [AUTOMATISCHE GRAVUR DES KARTENRAHMENS BEI DER NEUHERSTELLUNG DER TK 25]
Roland Haeberlein *In its* Repts. on Cartography and Geodesy. Ser. 1, No. 94 1984 p 85-92 In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

An automatic procedure to produce map frames, based on a

computer program to plot cadastral surveys, was developed. The procedure produces frameworks with graduations, graticule intersections, and trigonometric points. In addition to its higher accuracy in comparison with conventional procedures, the procedure is highly economical and has shorter processing times.
Author (ESA)

N85-27363# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
APPLICATION OF INTERACTIVE GRAPHIC SYSTEMS IN LAND CONSOLIDATION. PROCESSING OF PLANNING MAPS [ANWENDUNG INTERAKTIVER GRAPHISCHER SYSTEME IN DER FLURBEREINIGUNG. BEARBEITUNG VON PLANUNGSKARTEN]
Wolfgang Mueller *In its* Repts. on Cartography and Geodesy. Ser. 1, No. 94 1984 p 93-100 ref In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

Utilization of computer drawn planning maps is discussed. The hardware of the Aristograph 2000 system is described. The applications of interactive graphic systems include the graphic design of area estimates, and the graphic control of the numerically obtained area estimate. Programs are not very user-friendly, but the procedure saves time compared with the manual method.
Author (ESA)

N85-27364# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
A CONCEPT FOR MAP UPDATING USING DIGITAL IMAGE PROCESSING METHODS [EIN KONZEPT ZUR KARTENFORT FUEHRUNG MIT METHODEN DER DIGITALEN BILDVERARBEITUNG]
Juergen Peterle *In its* Repts. on Cartography and Geodesy. Ser. 1, No. 94 1984 p 101-109 refs In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

A method for topographic map updating based on two digital orthophotos computed from digital aerial photographs was developed. The first orthophoto corresponds to the old level of the map, the second contains the updating information. The working steps, beginning with orthophoto computation and ending with the generation of a screened ground plan of the map, have to be performed at least semiautomatically by computer. The problems concerning the extraction of cartographically relevant information from digital images are discussed, and the obtained pictures are shown.
Author (ESA)

N85-27365# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
RASTER OR VECTOR PROCESSING. EXPERIENCE WITH THE APPLICATION OF PROGRAMS FOR THE CONSTRUCTION OF THEMATIC MAPS WITH BOUNDARY DESIGN IN THE LOWER SAXONY (WEST GERMANY) LAND ADMINISTRATION FOR GROUND RESEARCH [RASTER- ODER VEKTORVERARBEITUNG. ERFAHRUNGEN BEI DER ANWENDUNG VON PROGRAMMEN ZUR KONSTRUKTION THEMATISCHER KARTEN MIT GRENZLINIENENTWUERFEN IM NIEDERSAECHSISCHEN LANDESAMT FUER BODENFORSCHUNG (NLFB)]
Horst Preuss *In its* Repts. on Cartography and Geodesy. Ser. 1, No. 94 1984 p 111-119 refs In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

The computer aided construction of thematic maps, especially boundary constructions, and area filling from point information is discussed. A computer program system which constructs boundaries in raster and in vector mode was developed. The differences between the two modes are demonstrated.
Author (ESA)

N85-27366# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
STATUS OF COMPUTER AIDED MAPPING IN HYDROGRAPHIC SERVICES [STAND DER DV-UNTERSTUETZTEN KARTOGRAPHIE BEI HYDROGRAPHISCHEN DIENSTEN]
Karl-Wilhelm Schrick *In its* Repts. on Cartography and Geodesy. Ser. 1, No. 94 1984 p 121-131 refs In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

Computer aided hydrographic cartography in important shipping nations is reviewed. It is concluded that digital methods are especially established for partial tasks; digitizing of complete map contents is still exceptional.
Author (ESA)

N85-27367# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
CONTOUR LINE GENERALIZATION USING DIGITAL IMAGE PROCESSING METHODS [HOEHENLINIENGENERALISIERUNG MIT METHODEN DER DIGITALEN BILDVERARBEITUNG]
Gerhard Schweinfurth *In its* Repts. on Cartography and Geodaesie. Ser. 1, No. 94 1984 p 133-155 refs In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

A method to generalize contour lines based on techniques of digital image processing is presented. It consists of preprocessing, generalization, and scale reduction. The generalization algorithm first thickens, and subsequently skeletonizes the lines. The operation is easily constructed and produces satisfactory results. The method can be considered as a component of a photogrammetric-cartographic process.
Author (ESA)

N85-27368# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
WHAT DOES DIGITAL IMAGE PROCESSING PERFORM IN THE PRODUCTION OF ORTHOPHOTOMAPS [WAS LEISTET DIE DIGITALE BILDVERARBEITUNG BEI DER HERSTELLUNG VON ORTHOPHOTOKARTEN]
Joachim Wiesel *In its* Repts. on Cartography and Geodaesie. Ser. 1, No. 94 1984 p 157-168 refs In GERMAN; ENGLISH summary (For primary document see N85-27357 16-43)
Avail: NTIS HC A08/MF A01

The production of orthophotos by digital image processing techniques is outlined. The digitizing of image data, orientation of measuring pictures, and geometric reorganization in the computer are described. Scanner apertures and cost/performance were investigated. Results for reproducing an orthophotomap (scale 1:5000) by screening are shown. All the processes of digital image processing can be applied in the production of orthophotos.
Author (ESA)

N85-27369# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
ACTIVE AND PASSIVE REMOTE SENSING OF ICE Semiannual Report, 1 Aug. 1984 - 31 Jan. 1985
J. A. Kong Jan. 1985 7 p
(Contract N00014-83-K-0258)
(AD-A151741) Avail: NTIS HC A02/MF A01 CSCL 08/12

This is a report on the progress that has been made in the study of active and passive remote sensing of ice during the period of August 1, 1984-January 31, 1985. During this period we have: (1) developed a two-layer anisotropic random medium model to exploit the anisotropic effect of sea ice for active and passive microwave remote sensing, (2) used the strong fluctuation theory and the fluctuation-dissipation theorem to calculate the brightness temperatures from a bounded layer of random discrete scatterers with the zero and first order approximations, and (3) participated in the microwave sea ice measurement program at the Cold Regions Research and Engineering Laboratory (CRREL) in New Hampshire.
GRA

N85-27370# INTERA Environmental Consultants Ltd., Houston, Tex.
REPORT ON REGIONAL GROUNDWATER FLOW MODELING FOR THE PALO DURO BASIN, TEXAS Status Report
R. W. Andrews Dec. 1984 254 p refs
(Contract DE-AC02-83CH-10140)
(DE85-007490; BMI/ONWI-504; SR-1) Avail: NTIS

HC A12/MF A01

Regional ground water flow within the principal hydrogeological units of the Palo Duro Basin is evaluated by developing a conceptual model of the flow regime in the shallow aquifers and the deep basin brine aquifers and testing these models using a three dimensional, finite difference flow code. Semiquantitative sensitivity analysis (a limited parametric study) is conducted to define the system response to changes in hydrologic properties or boundary conditions. Adjoint sensitivity analysis is applied to the conceptualized flow regime in the Wolfcamp carbonate aquifer. All steps leading to the final results and conclusions are incorporated in this report. The specific conceptual models, defining the areal and vertical averaging of lithologic units, aquifer properties, fluid properties, and hydrologic boundary conditions, are described in detail. The results are delineated by the simulated potentiometric surfaces and tables summarizing areal and vertical boundary fluxes, Darcy velocities at specific points, and ground water travel paths. DOE

N85-27371# Centre National d'Etudes Spatiales, Toulouse (France). Service ARGOS.
LOCATION AND DATA COLLECTION SATELLITE SYSTEM ARGOS. USER'S GUIDE
1985 38 p
Avail: NTIS HC A03/MF A01

The ARGOS satellite based localization system is described. The user platform weighs only 2 kg, and can be carried by a wide range of targets, e.g., balloons, icebergs, or animals. The platforms are linked to NOAA/TIROS-N satellites, which act as relay stations for platform and satellite environmental and experiment data. Special ground stations were built for direct data collection. The localization system is based on Doppler positioning, with 60% of platforms located at each satellite passage. Accuracy is within 100 m. The data processing system assures 99% availability of data; 66% of the data are available < 3 hr after measurement, 87.5% < 6 hr. Information includes raw and converted sensor data, and position, speed, and last localization date of platforms. Real time data transmission is assured by the Global Telecommunication System. Uses include wildlife radiolocation and environmental data collection. Author (ESA)

N85-27372# Bureau of Land Management, Anchorage, Alaska.
GLOSSARY OF LANDSCAPE AND VEGETATION ECOLOGY FOR ALASKA
Herman W. Gabriel and Stephen S. Talbot Dec. 1984 143 p refs
(PB85-153831; BLM/AK/TR-84/10) Avail: NTIS HC A07/MF A01 CSCL 06C

Vegetation description, interpretation, and inventory in Alaska is no longer the activity of a few ecologists. Today there are people who have a diversity of back-grounds and a multiplicity of interests doing field studies, preparing maps, and writing environmental statements and management plans which contain descriptions of vegetation and interpret vegetation ecology. Over 1,100 terms used in Alaskan reports or applicable to Alaskan conditions were compiled. GRA

N85-27373# Cornell Univ., Ithaca, N.Y.
STUDIES RELATED TO THE DEEP EARTH GAS: 1983 Annual Report
T. Gold 20 Mar. 1984 50 p refs Sponsored by Gas Research Inst.
(PB85-171114; GRI-84/0069) Avail: NTIS HC A03/MF A01 CSCL 21D

The report investigates the role of abiogenic methane in the outgassing of the Earth, specifically to determine whether there is a large enough supply of deep abiogenic methane to contribute significantly to our energy needs and, if so, whether it is possible to tap the supply. Three experimental and two theoretical lines of research were pursued. The question of whether abiogenic methane could contribute to petroleum deposits was investigated by two experiments: inverse cracking and methane pyrolysis. The objective of the inverse cracking experiment is to determine whether methane can react with hydrocarbons at temperatures and pressure conditions common to petroleum reservoirs in the presence of natural catalysts to form higher hydrocarbons. GRA

N85-27374# Federal Geodetic Control Committee, Washington, D.C.
STANDARDS AND SPECIFICATIONS FOR GEODETIC CONTROL NETWORKS
Sep. 1984 37 p refs
(PB85-166478; LC-84-600257) Avail: NTIS HC A03/MF A01 CSCL 08E

This single publication is designed to replace both Classification, Standards of Accuracy and General Specifications of Geodetic Control Surveys, issued February 1974, and Specifications to Support Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys, issued June 1980. Topics covered include the following: (1) Standards--(horizontal control network standards, vertical control network standards, gravity control network standards); (2) Specifications--(triangulation, traverse, inertial surveying, geodetic leveling, photogrammetry, satellite Doppler positioning, absolute gravimetry, relative gravimetry); (3) Governmental authority; and (4) variance factor estimation. Procedures for submitting data to the National Geodetic Survey are discussed. GRA

N85-26817# Joint Publications Research Service, Arlington, Va.
APPLICATION OF SPACE METHODS IN GEODESY
Anatoliy Mikhaylovich Mikisha *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 60-66 Transl. into ENGLISH from Kosmich. Metody v Geod. (Novoye v Zhizni, Nauke, Tekhn.: Ser. Kosmonavtika, Astron.) (Moscow), no. 9, Sep. 1984 p 43-50; 56-58 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26820# Joint Publications Research Service, Arlington, Va.
TENTH CONFERENCE OF WORKING GROUP OF SOCIALIST COUNTRIES ON REMOTE SENSING OF EARTH UNDER INTERCOSMOS PROGRAM Abstract Only
V. V. Yegorov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 81 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 111-113 Conf. held in Ulan-Bator, USSR, 26 Jun. - 2 Jul. 1984 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26824# Joint Publications Research Service, Arlington, Va.
STUDY AND MAPPING OF ANTHROPOGENIC EFFECT ON ENVIRONMENT IN DIFFERENT REGIONS OF USSR ON BASIS OF SPACE PHOTOGRAPHS Abstract Only
I. S. Kontoboytseva and V. I. Kravtsova *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 83 Transl. into ENGLISH from Vestn. Mosk. Univ., Ser. 5: Geografiya (Moscow), no. 6, Nov. - Dec. 1984 p 1118 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26825# Joint Publications Research Service, Arlington, Va.
MULTIPLE REGRESSION ANALYSIS OF PHOTOGRAPHIC IMAGE OF SOIL PROPERTIES Abstract Only
B. V. Vinogradov, C. Riedel, and A. N. Kaptsov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 84 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 278, no. 5, Oct. 1984 p 1274-1277 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26826# Joint Publications Research Service, Arlington, Va.
IDENTIFICATION OF STRUCTURE OF SOIL-VEGETATION COVER USING AERIAL AND SPACE PHOTOGRAPHS Abstract Only
S. M. Gorozhankina and V. D. Konstantinov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 84-85 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 42-52 Original language document was announced

in IAA as A85-25656 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26827# Joint Publications Research Service, Arlington, Va.
USE OF GOUDRIAN MODEL IN STUDYING LAWS OF REFLECTION IN VEGETATION-SOIL SYSTEM IN OPTICAL RANGE. 2: INFLUENCE OF ILLUMINATION CONDITIONS ON SPECTRAL BRIGHTNESS COEFFICIENTS Abstract Only
N. N. Vygodskaya and I. I. Gorshkova *In its* USSR Rept: Space (JPRS-USP-85-004) 6 May 1985 p 85-86 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 69-77 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06/MF A01

N85-26828# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF MESOFISSURING ON SPACE PHOTOGRAPHS: NEW TECHNIQUE FOR STUDY OF PETROLEUM AND GAS DEPOSITS Abstract Only
G. I. Amurskiy, G. A. Abramenok, and M. N. Solovyev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 86 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 36-41 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26829# Joint Publications Research Service, Arlington, Va.
MINIMIZING INFLUENCE OF EARTH'S CURVATURE IN PROJECTIVE RECTIFICATION OF SPACE PHOTOGRAPHS INTO PHOTOPLANS AND PHOTOMAPS Abstract Only
A. M. Kuzina, N. S. Ramm, and A. P. Skorodumov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 87 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 101-106 Original language document was announced in IAA as A85-25662 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27302# Joint Publications Research Service, Arlington, Va.
CHINA'S INTEGRATED CIRCUIT PRODUCTION
Pan Yujun *In its* China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 67-71 refs Transl. into ENGLISH from Renmin Ribao (Beijing, China), 22 Aug. 1984 p 3 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

N85-27734 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
INVESTIGATIONS OF THE ACCURACY OF THE DIGITAL PHOTOGRAMMETRY SYSTEM (DPS), A RIGOROUS THREE-DIMENSIONAL COMPILATION PROCESS FOR PUSHBROOM IMAGERY
O. Hofmann *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 277-286 refs Presented at ISPRS Kongr., Rio de Janeiro, Jun. 1984 (For primary document see N85-27724 16-81)
(MBB-UA-753/83-O) Avail: Issuing Activity

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N85-27375 Illinois Univ., Urbana-Champaign.
RESPONSE OF A WIND TURBINE BLADE TO SEISMIC AND TURBULENT WIND EXCITATIONS Ph.D. Thesis
Rex Chin-Yih Hong 1984 179 p
Avail: University Microfilms Order No. DA8502178

The purpose was to investigate the dynamic behavior of a wind turbine blade under seismic and turbulent wind excitations. Toward this goal a procedure was developed in which the Markov process theory and its stochastic differential equation are used to obtain equations for statistical moments of blade response variables. Such equations then can be used to determine certain moment stability conditions for any given set of parameters and moment responses if the system is stable. The results show that for a constant rpm wind turbine generator the uncoupled flapping, coupled flap lagging and coupled flap lag torsion of a wind turbine blade are very stable under normal operating conditions, and that torsion has little influence on the dynamic behavior of flapping and leadlagging motions. If the system is stable, the effect of turbulence on moment responses is greater than that of an earthquake, therefore, turbulence is likely the main cause for structural fatigue of wind turbine blades. Dissert. Abstr.

N85-27376 Department of the Navy, Washington, D. C.
DUAL ELECTROCHEMICAL SYSTEM Patent
J. R. Moden and R. I. Bristol, inventors (to Navy) Issued 22 Jan. 1985 4 p Supersedes AD-D011035
(AD-D011616; US-Patent-4,495,256; US-Patent-Appl-SN-573904; US-Patent-Class-429-17) Avail: US Patent and Trademark Office CSCL 10/2

This invention provides a means to increase the energy density of two electrochemical systems by using the by-product of each system as one of the necessary ingredients of the reactants of the other system. For example: (a)2Li+H2O2 yields 2LiOH, (b)2LiOH+3H2O2+2Al yields 2LiAlO2+4H2O, where the LiOH from (a) is used in (b) and the H2O from (b) is used to fulfill the dilution requirements of (a). GRA

N85-27377*# General Electric Co., Schenectady, N. Y. Advanced Energy Programs Dept.
PARAMETRIC STUDY OF POTENTIAL EARLY COMMERCIAL POWER PLANTS TASK 3-A MHD COST ANALYSIS Final Technical Report, Apr. 1983
Apr. 1983 51 p
(Contract DEN3-244)
(NASA-CR-175839; NAS 1.26:175839) Avail: NTIS HC A04/MF A01 CSCL 10B

The development of costs for an MHD Power Plant and the comparison of these costs to a conventional coal fired power plant are reported. The program is divided into three activities: (1) code of accounts review; (2) MHD pulverized coal power plant cost comparison; (3) operating and maintenance cost estimates. The scope of each NASA code of account item was defined to assure that the recently completed Task 3 capital cost estimates are consistent with the code of account scope. Improvement confidence in MHD plant capital cost estimates by identifying comparability with conventional pulverized coal fired (PCF) power plant systems is undertaken. The basis for estimating the MHD plant operating and maintenance costs of electricity is verified. E.A.K.

N85-27378# Sandia Labs., Albuquerque, N. Mex. Distributed Receiver Research Div.
A BIBLIOGRAPHY OF REPORTS OF THE SANDIA SOLAR THERMAL DISTRIBUTED RECEIVER SYSTEMS PROJECT
J. A. Leonard, ed. and C. R. Klimas, ed. Apr. 1984 52 p
(Contract DE-AC04-76DP-00789)
(SAND-84-0313) Avail: NTIS HC A04/MF A01

Sandia National Laboratories in Albuquerque manages the Distributed Receiver Technology and Applications Project of the U.S. Department of Energy's Solar Thermal Technology Program. The project generally covers R&D on parabolic troughs and dishes. Technical information developed by these projects is disseminated through technical publications, workshops, presentations at technical meetings, and contractor reports. A bibliography of solar thermal distributed receiver reports and publications by Sandia Laboratories and its contractors is presented. It is provided as a

convenient reference for those interested in solar thermal technology. Reports are listed by principal author, by report numbers, and by unnumbered reports. Author

N85-27379# Sandia Labs., Livermore, Calif. Systems Evaluation Div.
THE 10 MWe SOLAR THERMAL CENTRAL RECEIVER PILOT PLANT: BEAM SAFETY TESTS AND ANALYSES
T. D. Brumleve Jul. 1984 98 p refs
(Contract DE-AC04-76DP-00789)
(SAND-83-8035) Avail: NTIS HC A05/MF A01

Potential eye hazards of reflected heliostat beams were evaluated and the adequacy of the beam safety central strategy at the 10 MWe solar thermal central receiver pilot plant was verified. Special video techniques were used during helicopter flyovers and a ground level to determine retinal irradiance and image size relative to a reference Sun. Receiver brightness was also measured. Measured values were consistent with analyses, and safety provisions at the plant were found to be adequate. Other beam control strategies for heliostats designed to stow face-up in high winds are studied, and one strategy is checked experimentally during the helicopter flyover tests. E.A.K.

N85-27380*# Pioneer Engineering and Mfg. Co., Inc., Warren, Mich.
MANUFACTURING COST ANALYSIS OF A PARABOLIC DISH CONCENTRATOR (GENERAL ELECTRIC DESIGN) FOR SOLAR THERMAL ELECTRIC POWER SYSTEMS IN SELECTED PRODUCTION VOLUMES Final Report
11 Dec. 1981 37 p refs Prepared for JPL
(Contract JPL-955931)
(NASA-CR-175772; NAS 1.26:175772) Avail: NTIS HC A03/MF A01 CSCL 10A

The manufacturing cost of a General Electric 12 meter diameter concentrator was estimated. This parabolic dish concentrator for solar thermal system was costed in annual production volumes of 100 - 1,000 - 5,000 - 10,000 - 50,000 100,000 - 400,000 and 1,000,000 units. Presented for each volume are the costs of direct labor, material, burden, tooling, capital equipment and buildings. Also presented is the direct labor personnel and factory space requirements. All costs are based on early 1981 economics. DOE

N85-27381*# Purdue Univ., Lafayette, Ind.
MOD SILVER METALLIZATION FOR PHOTOVOLTAICS Quarterly Technical Report, 1 Dec. 1984 - 28 Feb. 1985
G. M. Vest and R. W. Vest 20 Mar. 1985 36 p refs Prepared for JPL
(Contract JPL-956697)
(NASA-CR-175773; DOE/JPL-956679-84/5; NAS 1.26:175773) Avail: NTIS HC A03/MF A01 CSCL 10A

The development of flat plate solar arrays is reported. Photovoltaic cells require back side metallization and a collector grid system on the front surface. Metallo-organic decomposition (MOD) silver films can eliminate most of the present problems with silver conductors. The objectives are to: (1) identify and characterize suitable MO compounds; (2) develop generic synthesis procedures for the MO compounds; (3) develop generic fabrication procedures to screen printable MOD silver inks; (4) optimize processing conditions to produce grid patterns and photovoltaic cells; and (5) develop a model which describes the adhesion between the fired silver film and the silicon surface. E.A.K.

N85-27382*# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div.
FLAT-PLATE SOLAR ARRAY PROJECT PROCESS DEVELOPMENT AREA: PROCESS RESEARCH OF NON-CZ SILICON MATERIAL Quarterly Report, 12 Jan. - 31 Mar. 1985
R. B. Campbell Apr. 1985 26 p Sponsored by NASA and DOE Prepared for JPL, Pasadena, Calif.
(Contract JPL-956616)
(NASA-CR-175777; DOE/JPL-956616-85/4; JPL-9950-1084; NAS 1.26:175777; WAESD-TR-84-0026; QR-4) Avail: NTIS HC A03/MF A01 CSCL 10A

During September 1984, a feasibility experiment was carried out using an excimer laser to fabricate junctions in dendritic web solar cells. In this test the laser beam was scanned across the web surface coated with a liquid dopant. During this process, a thin layer of Si was rapidly heated which should cause diffusion of the dopant into the Si. The subsequent rapid cooling would halt the diffusion. Thus, the diffusion profile should be controlled by the laser power, time of heating, etc. G.L.C.

N85-27383*# Florida Univ., Gainesville. Dept. of Electrical Engineering.
HEAVY DOPING EFFECTS IN HIGH EFFICIENCY SILICON SOLAR CELLS Quarterly Report
F. A. Lindholm and A. Neugroschel 31 Mar. 1985 41 p refs Sponsored in part by NASA and NSF Prepared for JPL
(NASA-CR-175779; DOE/JPL-956525-8517; NAS 1.26:175779; DRL-198; DRD-SE-7) Avail: NTIS HC A03/MF A01 CSCL 10A

A correlation of chemical and structural measurements with electrical measurements made on specially designed test structures reveals the mechanisms responsible for low effective surface recombination velocities S for (polysilicon)/silicon interfaces. The mechanisms are: (1) the low mobility in the highly disordered interfacial region of thickness less than several hundred Angstrom units where the arsenic concentration exceeds 10 to the 20th power/cu cm; and (2) the usual potential barrier associated with a low-high junction (n/n(+) or p/p(+). The second mechanism acts only if the adjoining crystalline silicon has a doping concentration about one order of magnitude below 10 to the 18th power/cu cm. For a doping concentration of 0 to the 16th power/cu cm, our measurements give S = 15 cm/s. The work reported announces results for arsenic-doped polysilicon deposited at 670 C; no intentional oxide is introduced. Implications for solar-cell design are suggested. M.G.

N85-27384*# Solarex Corp., Rockville, Md.
DOCUMENTATION AND SOLAR CELL MODULES Final Report
19 Mar. 1985 24 p ref Sponsored by NASA Prepared for JPL
(NASA-CR-175769; DOE/JPL-956333-1; NAS 1.26:175769; DRL-184; DRD-SE-2) Avail: NTIS HC A02/MF A01 CSCL 10A

The Solarex Block V Group II module is a large frameless module intended for installation in a larger panel framework for use in intermediate to large size power system arrays. The module is a large one, based on a 0.125-inch thick tempered glass superstrate, containing 117 square cells, each one 10 cm on a side, arranged in a 13 series 9 parallel matrix. The design peak power at 25 C is in the 135-140 watt range. The module has a novel back sheet comprising a laminate of Tedlar, Mylar and a modified polyethylene. The Solarex Block V Group II module, designated Model C-120-10A, passed the JPL Block V qualification tests. A number of cracks were observed in cells in he two modules which underwent 200 thermal cycles, but the peak power change was less than 2% in each case. Author

N85-27385*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF PRECIPITATION ON WIND TURBINE PERFORMANCE Final Report
Robert D. Corrigan and Richard D. Demiglio (Sverdrup, Inc.) May 1985 23 p refs
(Contract DE-AI01-76ET-20320)
(NASA-TM-86986; E-2530; DOE/NASA/20320-64; NAS 1.15:86986) Avail: NTIS HC A02/MF A01 CSCL 10A

The effects of precipitation on wind turbine power output was analyzed. The tests were conducted on the two bladed Mod-0 horizontal axis wind turbine with three different rotor configurations. Experimental data from these tests are presented which clearly indicate that the performance of the Mod-0 wind turbine is affected by rain. Light rainfall degraded performance by as much as 20 percent while heavy rainfall degraded performance by as much as 30 percent. Snow mixed with drizzle degraded performance by as much as 36 percent at low windspeeds. Also presented are the results of an analysis to predict the effect of rain on wind

turbine performance. This analysis used a blade element/momentum code with modified airfoil characteristics to account for the effect of rain and predicted a loss in performance of 31 percent in high winds with moderate rainfall rates. These predicted results agreed well with experimental data. Author

N85-27386*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PHOTOVOLTAIC POWERED VACCINE REFRIGERATOR-FREEZER SYSTEMS FIELD TEST RESULTS Final Report
Anthony F. Ratajczak Apr. 1985 99 p
(Contract DE-AI01-79ET-20485)
(NASA-TM-86972; DOE/NASA/20485-18; E-2498; NAS 1.15:86972) Avail: NTIS HC A05/MF A01 CSCL 10B

Photovoltaic-powered refrigerator/freezers suitable for vaccine storage were developed and field tested. Three refrigerator/freezers were qualified; one by Solar Power Corp. and two by Solavolt. Follow-on contracts were awarded to Solar Power Corp. for 19 field test systems and to Solavolt for 10 field test systems. The U.S. Agency for International Development joined in the field tests systems effort. A total of 29 systems were installed in 24 countries between October 1981 and October 1984. An explanation of the project, systems descriptions, installation experiences, performance data for the 22 systems for which field test data was reported, an operational reliability summary, and recommendations relative to system designs and future use of such systems are included. Performance data indicates that the systems are highly reliable and are capable of maintaining proper vaccine storage temperatures in a wide range of climatological and user environments. Author

N85-27387*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CYCLING PERFORMANCE OF THE IRON-CHROMIUM REDOX ENERGY STORAGE SYSTEM
Randall F. Gahn, Norman H. Hagedorn, and Jerome A. Johnson 1985 19 p refs Proposed for presentation at the 20th Intersoc. Energy Conversion Eng. Conf., Miami Beach, Fla., 18-23 Aug. 1985; sponsored by SAE, ANS, ASME, IEEE, AIAA, ACS, and AIChE
(Contract DE-AI04-80AL-12726)
(NASA-TM-87034; E-2590; DOE/NASA/12726-25; NAS 1.15:87034) Avail: NTIS HC A02/MF A01 CSCL 10C

Extended charge-discharge cycling of this electrochemical storage system at 65 C was performed on 14.5 sq cm single cells and a four cell, 867 sq cm bipolar stack. Both the anolyte and catholyte reactant fluids contained 1 molar concentrations of iron and chromium chlorides in hydrochloric acid and were separated by a low-selectivity, cation-exchange membrane. The effect of cycling on the chromium electrode and the cation-exchange membrane was determined. Bismuth and bismuth-lead catalyzed chromium electrodes and a radiation-grafted polyethylene membrane were evaluated by cycling between 5 and 85 percent state-of-charge at 80 mA/sq cm and by periodic charge-discharge polarization measurements to 140 mA/sq cm. Gradual performance losses were observed during cycling but were recoverable by completely discharging the system. Good scale-up to the 867 sq cm stack was achieved. The only difference appeared to be an unexplained resistive-type loss which resulted in a 75 percent W-hr efficiency (at 80 mA/sq cm versus 81 percent for the 14.5 sq cm cell). A new rebalance cell was developed to maintain reactant ionic balance. The cell successfully reduced ferric ions in the iron reactant stream to ferrous ions while chloride ions were oxidized to chlorine gas. Author

N85-27388*# Clemson Univ., S.C. Dept. of Electrical and Computer Engineering.
PHOTOVOLTAIC CELL RELIABILITY RESEARCH: INVESTIGATION OF ACCELERATED STRESS FACTORS AND FAILURE-DEGRADATION MECHANISMS IN TERRESTRIAL SOLAR CELLS Annual Report
J. W. Lathrop Sep. 1984 77 p refs Prepared for JPL
(Contract NAS7-100)
(NASA-CR-175815; DOE/JPL-954929-84-11; NAS 1.26:175815; DE85-007144; AR-5; DRD-SE-7) Avail: NTIS HC A05/MF A01 CSCL 10A

Results of an ongoing research program into the reliability of terrestrial solar cells are presented. The main focus of the research is to identify failure/degradation modes affecting solar cells and to relate these to basic physical, chemical, and metallurgical phenomena. The program is concerned with the reliability attributes of individual single crystalline, polycrystalline, and amorphous thin film silicon cells. Results of subjecting different types of crystalline cells to the Clemson accelerated test schedule are given. Preliminary step stress results on one type of thin film amorphous silicon (a:Si) cell indicated that extraneous degradation modes were introduced above 140 C. Development of measurement procedures which are applicable to the reliability testing of a:Si solar cells are also described. An approach to achieving the necessary repeatability, currently being explored, of fabricating a simulated a:Si reference cell from crystalline silicon photodiodes is described. DOE

N85-27389# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
INVESTIGATION OF PSEUDO BI-POLAR NICKEL CADMIUM BATTERIES AS FILTER ELEMENTS FOR PULSED POWER LOADS M.S. Thesis
M. B. Cimino and G. M. Gearing Dec. 1984 109 p
(AD-A152112; AD-E401303; AFIT/GE/ENG/84D-18) Avail: NTIS HC A06/MF A01 CSCL 10/3

This investigation consisted of several tests of specially fabricated nickel-cadmium batteries having circular disk type electrodes. These batteries were evaluated as filter elements between a constant current power supply and a five hertz pulsed load demanding approximately twice the power supply current during the load on portion of the cycle. Short tests lasting 10,000 cycles were conducted at up to 21 C rate and an equivalent energy density of over 40 Joules per pound. In addition, two batteries were subjected to 10,000,000 charge/discharge cycles, one at a 6.5 C rate and the other at a 13 C rate. Assuming an electrode to battery weight ratio of 0.5, these tests represent an energy density of about 7 and 14 Joules per pound respectively. Energy density, efficiency, capacitance, average voltage, and available capacity were tracked during these tests. GRA

N85-27390# Naval Weapons Center, China Lake, Calif.
MAINTENANCE OF PHOTOVOLTAIC POWER SYSTEMS Maintenance Manual
M. R. Hall Aug. 1984 75 p
(AD-A152299; AD-E900425; NWC-TP-6563) Avail: NTIS HC A04/MF A01 CSCL 10/2

This publication establishes standard practices for inspection, testing, and maintenance of photovoltaic power systems at Dept. of the Navy installations. The practices and procedures are recommended to ensure reliable operation of the power systems. The manual covers photovoltaic-array, battery, voltage-regulator, inverter, and wiring subsystems. In addition, this manual provides a troubleshooting guide and self-study questions and answers. GRA

N85-27391# ENTECH Corp., Dallas-Fort Worth Airport, Tex.
DESIGN AND DEVELOPMENT OF A LINEAR FRESNEL LENS AIR-COOLED PHOTOVOLTAIC MODULE AND A STAND-ALONE PHOTOVOLTAIC COLLECTOR ARRAY
Jan. 1985 124 p refs
(Contract DE-AC04-76DP-00789)
(DE85-006854; SAND-84-7018) Avail: NTIS HC A06/MF A01

A summary description of the design development of a linear Fresnel lens air cooled photovoltaic collector and a stand alone photovoltaic collector array is presented. Module performance is characterized by 12.9% electrical efficiency under operational conditions (800 w/m(2), 20 C ambient temperature) and 14.2% electrical efficiency at 28 C cell reference temperature. The stand alone photovoltaic collector array design utilizes eight air cooled photovoltaic modules and produces a peak output of 2680 watts at 20 C ambient temperature and 1000 w/m(2) direct normal

insolation. This corresponds to an overall array electrical efficiency of 12%. A prototype subscale array was fabricated and performance tested and verified the stand alone array concept. DOE

N85-27392# Department of Energy, Washington, D. C.
WIND ENERGY TECHNOLOGY PROGRAM SUMMARY
Oct. 1984 2 p
(DE85-007349; DOE/CE-0113) Avail: NTIS HC A02/MF A01

The purpose of the Federal Wind Energy Technology Program is to perform research that will enable the private sector to develop and utilize safe, reliable, and efficient wind energy systems. Generic research will provide the technology base and scientific understanding necessary to allow industry to develop wind energy systems competitive with conventional energy sources. The goal of the DOE wind program is to improve the basic understanding of aerodynamics and structural dynamics in order to more accurately predict wind turbine aerodynamic performance, natural resonance frequencies, and structural loads. Areas included in the research plan being developed for the next five years include: advanced fluid dynamics, aerodynamics research, structural dynamics research, and advanced components and systems research, including multimegawatt (MOD-5) development. DOE

N85-27393# Sandia Labs., Albuquerque, N. Mex.
SELECTION OF PROMISING SITES FOR MAGMA ENERGY EXPERIMENTS
C. C. Carson Jan. 1985 19 p
(Contract DE-AC04-76DP-00789)
(DE85-006832; SAND-84-2171) Avail: NTIS HC A02/MF A01

The Long Valley and Coso Hot Springs areas of California were identified as the most promising sites for conducting a magma energy extraction experiment. These two locations were selected from among the potential sites on the basis of several factors that are critical to the success of the proposed long-term energy extraction experiment. These factors include the likelihood of the existence of shallow magma targets as well as several other drilling, energy extraction and programmatic considerations. As the magma energy extraction program continues, these sites will be analyzed in detail so that one can be selected as the site for the planned magma experiment. DOE

N85-27394# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
AN EVALUATION OF THERMAL STORAGE FOR LIQUID-METAL, SOLAR THERMAL RECEIVERS
Robert J. Copeland Dec. 1984 140 p refs
(Contract DE-AC02-83CH-10093)
(DE85-002929; SERI/TR-252-1956) Avail: NTIS HC A07/MF A01

The DOE Department of Advanced Conservation, Technologies Division of Physical and Chemical Energy Storage and the Office of Solar Applications for Industry, Division of Solar Thermal Energy Systems have developed a joint program plan to accelerate the development of thermal storage for solar thermal applications. The plan focuses on the development of thermal energy storage for solar thermal collector/receiver systems and the specific applications of each system. The SERI systems analysis of thermal storage concepts for liquid-metal receivers is documented. The objectives are to conduct a comparative ranking of thermal storage technologies and to make recommendations on the future development of those technologies. Obtainable cost estimates are compared with value for both electric power and process heat applications. DOE

N85-27395# Virginia Polytechnic Inst. and State Univ., Blacksburg. Environmental Systems Lab.
A MULTIFUNCTION WALL SYSTEM FOR APPLICATION WITH SOLAR HEATING AND GROUND COOLING Final Technical Report, 1 Sep. 1981 - 15 Jan. 1984
James F. Riley and Robert P. Schubert [1985] 64 p refs
(Contract DE-AS05-81ER-10993)
(DE85-006792; DOE/ER-10993/1) Avail: NTIS HC A04/MF A01

The research presented in this report is an exploration of one alternative energy building system concept which is attempting to produce performance characteristics in a way closely approaching those of conventional fossil fuel heating and cooling systems. This alternative energy building system is a multifunction wall system for application with solar-heating and ground-cooling. The concept of the system is to expand the use of structure and enclosure elements of a building to function additionally as: (1) the ductwork for the solar-heated or earth-cooled air; (2) the heat transfer membrane between the heated or cooled air and the living environment of the building; (3) the heat storage medium (in winter); and (4) the temperature leveling and control medium. All these functions are integrated into a single wall construction using a new concrete block, surface-bonding cement, and the exterior insulation system. This report presents the series of experiments conducted on the Multifunction Wall System. DOE

N85-27396# Hickling (James F.) Management Consultants Ltd., Ottawa (Ontario).
CENTRAL SOLAR HEATING PLANTS WITH SEASONAL STORAGE. EVALUATION OF SYSTEMS CONCEPTS BASED ON HEAT STORAGE IN AQUIFERS
Verne G. Chant and Dwayne S. Breger (Argonne Natl. Lab.) Oct. 1984 207 p Sponsored in part by National Research Council of Canada
(Contract W-31-109-eng-38)
(DE85-006788; DOE/NBM-5006788) Avail: NTIS HC A10/MF A01

The work undertaken by the aquifer seasonal thermal energy storage team from the USA and Canada is documented. The analytic effort was divided between heat pump systems and systems without heat pumps. The aquifer based system configurations that were analyzed are defined, and the approach and methodology employed in this analysis are outlined. Principal results are presented in terms of optimum designs for reference cases, and sensitivity results around the reference cases for selected variables. Characteristics of system designs are given for a wide range of key design parameters. System parameter values are listed and more detailed results of the analysis are presented. DOE

N85-27397# Illinois Dept. of Energy and Natural Resources, Springfield.
CURRENT ALTERNATIVE ENERGY RESEARCH AND DEVELOPMENT IN ILLINOIS
R. Swager Dec. 1984 182 p
(PB85-163137; IL/ENR/AE-85/01) Avail: NTIS HC A09/MF A01 CSCL 10A

This directory lists research and demonstration projects, as well as sponsoring organization and investigators involved in developing nonfossil, nonnuclear energy sources. Areas of concern are: bioenergy; solar heating and cooling; solar photovoltaics; solar thermal and advanced technologies; geothermal and ocean thermal; wind energy; waste heat and materials recovery; and energy storage projects performed by Illinois organizations, both within by out-of-state organizations at sites within Illinois. GRA

N85-26813# Joint Publications Research Service, Arlington, Va.
SPACE POWER PLANTS
Sergey Andreyevich Khudyakov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 37-56 Transl. into ENGLISH from Kosmich. Energ. (Novoye v Zhizni, Nauke, Tekhn.: Ser. Kosmonavtika, Astron.) (Moscow), no. 7, Jul. 1984 p 36-63 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27036# Joint Publications Research Service, Arlington, Va.
SOLAR ELEMENTS WITH DISTRIBUTED PARAMETERS Abstract Only
Kh. K. Aripov, V. D. Rumyantsev, and A. F. Ioffe *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 11 refs Transl. into ENGLISH from Geliotekh. (Tashkent, USSR), no. 5, Mar. 1983 p 3-6 (For primary document see N85-27035

16-31)
Avail: NTIS HC A05/MF A01

N85-27737 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
TRANSIENT BEHAVIOR OF A SINGLE-BLADE HORIZONTAL-AXIS WIND TURBINE
R. Wennekers *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 327-345 refs Presented at 10th European Rotorcraft Forum, The Hague, 28-31 Aug. 1984 (For primary document see N85-27724 16-81)
(MBB-UD-421/84-O) Avail: Issuing Activity

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N85-27398 Queensland Univ., St. Lucia (Australia). Dept. of Civil Engineering.
GROUNDWATER MODEL FOR AN ISLAND AQUIFER: BRIBIE ISLAND GROUNDWATER STUDY
L. T. Isaacs and F. D. Walker Sep. 1983 43 p refs
(CE-44) Avail: NTIS HC A03/MF A01

The development and calibration of a steady, regional groundwater model of the unconfined aquifer of an island is described. The water supply of a large sand island with population centers was examined. The water supply is extracted from the unconfined aquifer by a long trench excavated below the water table. The water resources and development of management strategies to optimize the supply are evaluated. The model assesses the current situation and determines the effects of proposed recharge schemes. E.A.K.

N85-27399# Oak Ridge National Lab., Tenn.
COMPARISON OF OBSERVED AND PREDICTED SHORT-TERM TRACER-GAS CONCENTRATIONS IN THE ATMOSPHERE
S. J. Cotter, C. W. Miller, and W. C. T. Lin 1985 10 p refs Presented at 18th Midyear Topical Symp. of the Health Phys. Soc., Colorado Springs, 6 Jan. 1985
(Contract DE-AC05-84OR-21400)
(DE85-007566; CONF-850106-10) Avail: NTIS HC A02/MF A01

A series of atmospheric tracer studies is being conducted. The inert gas sulfurhexafluoride is released from a height of 62 m for 15 min and concentrations in air are measured on sampling arcs up to 30 km downwind of the release point. Maximum 15 min air concentrations from 14 of these tracer tests are compared with the ground level, centerline air concentration predicted with a Gaussian plume atmospheric transport model using eight different sets of atmospheric dispersion parameters. The median value of the ratio of predicted to observed air concentrations for this set of parameters is 1.3, and the correlation coefficient between the log of the predictions and the log of the observations is 0.72. The Gaussian plume model is widely used to predict air concentrations resulting from short term radionuclide release to the atmosphere. The results of comparisons such as these must be considered whenever the Gaussian model is used for such purposes. DOE

N85-27400# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
USE OF FOREST MODELING TO PROJECT ACID RAIN EFFECTS
Virginia H. Dale and Darrell C. West 1984 7 p refs Presented at the Natl. Acid Precipitation Program Meeting, Asheville, N.C., 13 Nov. 1984
(Contract DE-AC05-84OR-21400)
(DE85-005251; CONF-8411137-3) Avail: NTIS HC A02/MF A01

The FORAST project is expected to provide a measure of growth rate changes for tree species, which will form a more realistic basis for developing a range of growth responses in the FORET model. Thus, the stress parameters will be tied more closely to observed changes in diameter increment that were the parameters of previous modeling efforts. A validation study will be performed for the FORET simulator under stressed and non-stressed conditions. Projected diameter increment will be compared with observed ones by species and canopy class, using tree cores taken from a study designed to quantify competitive interactions in a forest stand. The model will then be used to project the effects of stress on forest structure over the next 100 years, assuming various hypotheses of stress effects. The current hypothesis to be examined is that present rates of growth will continue for the next 100 years. The Forest Inventory data of the USDA Forest Service will be used to verify that within each region the model is initiated correctly. Model output will be classified into forest-type groups, and a map will be produced of the projected vegetation types of the northeastern US under the stated hypothesis. DOE

N85-27401# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
INTERACTIVE EFFECTS OF ACID RAIN AND GASEOUS AIR POLLUTANTS ON NATURAL TERRESTRIAL VEGETATION
S. B. McLaughlin, C. F. Baes, III, G. E. Taylor, R. F. Walker, L. L. Sigal, R. K. McConathy, and R. J. Norby 1984 14 p refs Presented at the Natl. Acid Precipitation Assessment Program Meeting, Asheville, N. C., 13 Nov. 1984
(Contract DE-AC05-84OR-21400)
(DE85-005255; CONF-8411137-5) Avail: NTIS HC A02/MF A01

Concentration thresholds are identified for individual and combined effects of acid rain and ozone on growth and growth processes of both forest tree seedlings and lichens and to document the significance of changing patterns of deposition and/or mobilization of trace metals and nutrients in tree rings. Greenhouse studies have focused on effects of varying levels of rainfall acidity on growth and nutrient uptake efficiency of mycorrhizal and nonmycorrhizal seedlings of white oak and loblolly pine from soil nutrient pools. Combined effects of rainfall acidity (pH 4.0 and 5.0), mist acidity (pH 3.5 and 5.0), and ozone (0 and 0.12 ppM) and soil type on growth and physiology of red spruce in two soil types have also been examined. Preliminary results indicate no adverse effects of acid rain, acid mist, or ozone on seedling growth but significant differences in response of seedlings on different soil types. Studies of the uptake and distribution of trace metals in tree rings of shortleaf pine have documented increases in aluminum, cadmium, copper, iron, manganese, and zinc in recent decades which appear to reflect changing regional and/or local availability of those elements. DOE

N85-27402# National Fisheries Research Lab., Columbia, Mo.
ACID RAIN: EFFECTS ON FISH AND WILDLIFE
K. S. Mayer, E. P. Multer, and R. K. Schreiber 1984 12 p refs (PB85-154672; Fish/Wildlife-Leaflet-1) Avail: NTIS HC A02/MF A01 CSCL 06C

The following questions concerning acid rain are discussed: what is acid rain; what causes acid rain; where do sulfur and nitrogen oxides originate; what areas in the U.S. are susceptible to acid rain; are there early warning signals of acidification to aquatic resources; how does acid rain affect fishery resources; does acid rain affect wildlife; and how can effects of acid rain be reduced. GRA

N85-27403# Environmental Protection Agency, Corvallis, Oreg. Office of Research and Development.
IMPACT OF OZONE ON VEGETATION
D. T. Tingey Dec. 1984 39 p refs
(PB85-159937; EPA-600/D-84-291) Avail: NTIS HC A03/MF A01 CSCL 06C

Visible injury on vegetation is one of the earliest and most obvious manifestations of ozone injury. However, ozone effects are not limited to visible injury; impacts range from reduced plant growth, decreased yield, changes in crop quality and alterations in susceptibility to abiotic and biotic stresses. Several approaches were used to estimate the ozone concentrations and exposure durations that induce foliar injury. Most of these studies used short-term exposures (less than 1 day) and measured visible injury

as the response variables. An alternative approach for estimating ozone concentrations and exposure durations which induce foliar injury is the use of limiting value analysis. The limiting values were developed from a review of the literature and represent the lowest concentration and exposure duration reported to cause visible injury on various plant species. The analysis was based on more than 100 studies of agricultural crops and 18 studies of tree species. GRA

N85-27404# North Carolina State Univ., Raleigh.
ECOLOGY OF PAMLICO RIVER, NORTH CAROLINA: AN ESTUARINE PROFILE
B. J. Copeland, R. G. Hodson, and S. R. Riggs (East Carolina Univ.) Apr. 1984 101 p refs Sponsored by Fish and Wildlife Service
(PB85-155703; FWS/OBS-82/06; LC-83-600609) Avail: NTIS HC A06/MF A01 CSCL 06F

The Pamlico River Estuary in eastern North Carolina is a continuation of the freshwater Tar River and a major tributary to Pamlico Sound, the primary estuarine fishing ground of the State. Water circulation in the estuary is dominated by wind and freshwater inflow. Water salinities range from oligohaline in the upper reaches of the river to mesohaline in most of the lower estuary. Summer water stratification and deoxygenation of bottom waters is a commonly occurring phenomenon. The Pamlico River Estuary is a phytoplankton-based system, supplemented by detrital inputs. Phytoplankton concentrations peak in the spring with a dinoflagellate bloom. Three distinct macrobenthic assemblages dominated by mollusks and annelids occur in shallow water along the salinity gradient. The estuary serves as an important nursery ground for the postlarvae and juveniles of a number of migratory fish species and shrimp and blue crabs. GRA

N85-27405# Florida State Univ. System, Gainesville.
REVIEW AND ANNOTATED BIBLIOGRAPHY OF BENTHIC STUDIES IN COASTAL AND ESTUARINE AREAS OF FLORIDA WITH A SELECTED COMPILATION OF WORLDWIDE BENTHIC METHODOLOGICAL REFERENCES AND SOUTHEASTERN UNITED STATES BENTHIC TAXONOMIC REFERENCES
S. Mahadevan, J. Sprinkel, D. Heatwole, and D. H. Wooding Aug. 1984 587 p Prepared in cooperation with Mote Marine Lab.
(Contract DI-14-12-0001-29037; Grant NA80AA-D-00038)
(PB85-151041; SGR-66) Avail: NTIS HC A25/MF A01 CSCL 08A

Benthic ecology, the study of bottom dwelling flora and fauna, flourished in the state of Florida in the last two decades. The abundance and diversity of benthic habitats in and around the state and the pressures of water use and waterfront development have both contributed to the advancement of research in this field. Almost 75% of the research on benthic habitats and organisms conducted in the last decade was done to either evaluate or mitigate an environmental problem. A reasonable compilation of the majority of benthic studies conducted in Florida's waters was not available to date; this report is an attempt to do so, at least for the coastal and estuarine areas of Florida. Author

N85-27406# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning and Standards.
REVIEW OF NATIONAL EMISSION STANDARDS FOR MERCURY
Dec. 1984 72 p refs
(PB85-153906; EPA-450/3-84-014) Avail: NTIS HC A04/MF A01 CSCL 13B

This report presents the findings of the 5-year review of the national emission standards for mercury. Industries subject to the existing standard are mercury-cell chlor-alkali plants, sludge drying and incineration plants, and mercury ore processing facilities. Information and estimates are presented concerning processes, mercury emissions, control technology, compliance status, and industry growth. Information is presented about other industry source categories which have mercury air emissions, but are not regulated by the standards. GRA

N85-27407# Smith (Ted B.) and Associates, Inc., Pasadena, Calif.
UTILIZATION OF REMOTE SENSING DATA IN THE EVALUATION OF AIR POLLUTION CHARACTERISTICS IN THE SOUTH COAST/SOUTHEAST DESERT AIR BASIN Final Report, Dec. 1982 - Jun. 1984
T. B. Smith and J. G. Edinger 15 Jun. 1984 112 p refs
(PB85-162063; ARB-R-84-236) Avail: NTIS HC A06/MF A01 CSCL 13B

Lidar aircraft data was collected in July 1981 by the Environmental Monitoring Systems Laboratory of EPA in conjunction with the Southeast Desert Transport Study. The lidar aircraft was flown on 10 days during the study period. On four occasions, flights were made on the day of a tracer release, followed by a morning flight on the following day to evaluate the pollutant carry over in the desert. The present report provides an analysis of the lidar data in relation to the existing terrain and meteorological environments. Of particular interest were cross sections through the San Fernando Valley and Elsinore Convergence Zones which illustrates these two important mechanisms for removal of pollutants from the Los Angeles Basin. Author (GRA)

N85-27408# California Inst. of Tech., Pasadena.
EVALUATION OF CHEMICAL REACTION MECHANISMS FOR PHOTOCHEMICAL SMOG. PART 2: QUANTITATIVE EVALUATION OF THE MECHANISMS, REVISED
J. A. Leone and J. H. Seinfeld Nov. 1984 209 p refs
(PB85-166080; EPA-600/3-84-063-Pt-2) Avail: NTIS HC A10/MF A01 CSCL 07D

Six chemical reaction mechanisms for photochemical smog were analyzed to determine why, under identical conditions, they predict different maximum ozone concentrations. To perform the analysis, a counter species technique was used to determine the contributions of individual reactions or sets of reactions to the overall behavior of the chemical reaction mechanism. Using this technique, answers were obtained to previously inaccessible questions such as what is the relative contribution of individual organic species to photochemical ozone formation. Based on the results of the counter species analysis specific aspects of each mechanism were identified that are responsible for the discrepancies with other mechanisms. For each mechanism, parameters were identified that when altered brought the predictions of the various mechanisms into much closer agreement. GRA

N85-27409# Santa Fe Research Corp., Bloomington, Minn.
AIR QUALITY BENEFIT ANALYSIS FOR LOS ANGELES AND SAN FRANCISCO BASED ON HOUSING VALUES AND VISIBILITY Final Report, Dec. 1982 - Jun. 1984
John Trijonis, Mark Thayer (San Diego State Univ.), James Murdoch (Northeast Louisiana Univ.), and Ronda Hageman (San Diego State Univ.) Jan. 1985 129 p refs
(PB85-166049; ARB-R-85/237) Avail: NTIS HC A07/MF A01 CSCL 05C

Benefits of improved air quality are estimated by examining the public's willingness to pay for visibility as revealed in home sale prices. The 1978 to 79 period in two study areas, Los Angeles (four counties) and San Francisco (five counties) was investigated. An extremely large, finely resolved data set for visibility levels, home sale prices, and house/community/location/socio-economic characteristics was analyzed. The data are gathered from 39 airport weather stations (visibility), the Market Data Cooperative (home sale prices and house specific characteristics), as well as the Census and other data sources (other characteristics). The economic analysis follows the hedonic price method. First, home sale price is related statistically to visibility and the house/community/location/socio-economic characteristics. Next the hedonic price for visibility is related to visibility levels and income levels in order to determine the economic (inverse) demand curve. This demand curve in turn yields estimates of benefits. GRA

N85-27410# Pacific Northwest Lab., Richland, Wash.
ACID PRECIPITATION IN NORTH AMERICA: 1980, 1981 AND 1982 ANNUAL DATA SUMMARIES FROM ACID DEPOSITION SYSTEM DATA BASE

A. R. Olson and C. R. Watson Dec. 1984 228 p refs (PB85-162477; EPA-600/7-84-097) Avail: NTIS HC A11/MF A01 CSCL 05B

The Acid Deposition System (ADS) data base for North American wet deposition data is used to provide an overview of the major North American monitoring networks: NADP, CANSAP, APN, MAP3S/PCN, EPRI/SURE, UAPSP and APIOS daily and cumulative. Individual site annual statistical summaries for calendar years 1980, 1981, and 1982 are given to pH, specific conductance, hydrogen ion (derived from pH) and ion species sulfate, nitrate, ammonium, calcium, chloride, sodium, magnesium and potassium. The summaries are prepared under common valid sample screening criteria and four criteria used to determine the reporting of individual sites. Based on the annual summaries, 1980, 1981, and 1982, North American spatial isopleth maps are constructed for precipitation weighted mean pH, sulfate ion and nitrate ion concentrations and annual deposition of hydrogen, sulfate and nitrate ion species. The Acid Deposition System (ADS) for data storage and statistical reporting of atmospheric deposition data was established by the EPA at the Pacific Northwest Laboratory (PNL). GRA

N85-27341# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway).
MONITORING OF MARINE ENVIRONMENT
Niels S. Nergaard *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 13 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

N85-27443# Witwatersrand Univ., Johannesburg (South Africa). Nuclear Physics Research Unit.
ELEMENTAL ANALYSIS OF AEROSOLS IN TRANSVAAL URBAN AND POWER-PRODUCING AREAS USING TIME AND SIZE-RESOLVED SAMPLES Abstract Only
H. J. Annegarn *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 1 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

N85-27444# ESCOM, Cleveland (South Africa). Environmental Test and Research.
ACID RAIN: TOWARDS AUTOMATED MONITORING Abstract Only
Margaret Boehm *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 2 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

N85-27449# Natal Univ., Durban (South Africa). Dept. of Chemical Engineering.
A WIND-BIVANE/MICROPROCESSOR SYSTEM FOR ON-LINE PREDICTION AND DISPLAY OF POLLUTANT DISTRIBUTIONS Abstract Only
L. W. Burger *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 10 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

N85-27452# Cape Town Univ., Rondebosch (South Africa). Energy Research Inst.
EFFECT OF TRAFFIC AND METEOROLOGY ON AIR POLLUTION Abstract Only
R. K. Dutkiewicz *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 15 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

N85-27462# National Physical Research Lab., Pretoria (South Africa). Atmospheric Sciences Div.
GROUND-BASED REMOTE SENSING OF ATMOSPHERIC POLLUTION Abstract Only
R. G. VonGogh *In its* Symp. on Atmospheric Sci. in South Africa 1983 p 50 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N85-27411 Washington Univ., Seattle.
A STUDY OF THE EFFECT OF GENTLY VARYING TERRAIN ON ATMOSPHERIC FLOW NEAR THE SURFACE Ph.D. Thesis
Philip Hart Kahn 1984 264 p
Avail: University Microfilms Order No. DA8501061

An extensive dataset obtained at the Boulder atmospheric Observatory (BAO), a site with gently varying terrain, is investigated. Included in the analysis are wind measurements obtained from NCAR's Portable Automated Mesonet (PAM); wind and turbulent flux measurements from the BAO's 300 meter tower; and wind and temperature profile and flux measurements obtained from University of Washington's surface layer instrumentation. The objective is the isolation of specific terrain effects on the observed winds. The wind direction data from the PAM are corrected to eliminate spurious biases, presumably introduced when the network was installed. The correction reduces the standard deviation of the wind dircetion among the stations by 50%. Periods of diffluence and confluence of the PAM wind fields are observed for westerly flow. Pairs of PAW stations are compared to isolate effects of the stations' local environments on their measured winds. Several statistically significant signals are found and related to the terrain. Dissert. Abstr.

N85-27412 Georgia Inst. of Tech., Atlanta.
AN INVESTIGATION OF TROPOSPHERIC IONS Ph.D. Thesis
Mark Dewayne Perkins 1984 163 p
Avail: University Microfilms Order No. DA8501226

Using a high pressure drift tube mass spectrometer, reduced mobility measurements of ions of atmospheric interest have been made as a function of temperature. Specifically, the mobilities of NO2-, NO3-, CO3-, B1-, Cl-, NH4+, NO2-. H2O, NO3-. H2O, CO3-. H2O, and CO4-. H2O in nitrogen and NO2-, NO3-, O2+, CO3-, and CO4- in oxygen have been measured. These ions have been observed in the stratosphere and above. Mass identification of ions in the atmosphere has been made only in the atmosphere and above, since, at these altitudes, the neutral gas density is considerably lower and the ion concentrations are generally higher than at ground level. For this thesis an apparatus which is capable of directly sampling ions in the troposphere has been developed. This device can mass analyze and detect ions at concentrations as low as 100 to 1000 ions per sq cm at atmospheric pressures (760 torr). Dissert. Abstr.

N85-27413*# Washington Univ., Seattle. Dept. of Atmospheric Sciences.
WAVE DYNAMICS AND TRANSPORT IN THE STRATOSPHERE Final Technical Report, 1 Oct. 1983 - 31 Jan. 1985
J. R. Holton and C. B. Leovy 31 Jan. 1985 4 p refs (Grant NAG2-66)
(NASA-CR-175789; NAS 1.26:175789) Avail: NTIS HC A02/MF A01 CSCL 04A

Research concentrated on three major aspects of middle atmosphere dynamics: the role of gravity wave breaking in the momentum budget of the mesosphere, the roles of planetary waves in the transport of long lived chemical tracers, and the mixing and dispersion caused by planetary wave breaking in the winter hemisphere. Work began on a new initiative to develop a middle atmosphere version of the spectral eneral circulation model. R.J.F.

N85-27414*# Harvard Univ., Cambridge, Mass.
MEASUREMENT OF ELEMENTS IN THE STRATOSPHERE Final Technical Report

James G. Anderson 1985 353 p refs
(Contract NASw-3242)
(NASA-CR-175891; NAS 1.26:175891) Avail: NTIS HC A16/MF A01 CSCL 04A

Balloon-borne winch system; stratospheric free radicals; stratospheric sounding; copper vapor lasers; ozone measurement; NO2 analysis; chlorine chemistry; trace elements; and ClO observations are discussed. For individual titles, see N85-27415 through N85-27421.

N85-27415*# Harvard Univ., Cambridge, Mass. Dept. of Chemistry.
FREE RADICALS IN THE STRATOSPHERE: A NEW OBSERVATIONAL TECHNIQUE Final Report
James G. Anderson, N. L. Hazen, B. E. McLaren, S. P. Rowe, C. M. Schiller, M. J. Schwab, L. Solomon, E. E. Thompson, and E. M. Weinstock *In its* Meas. of Elements in the Stratosphere 1985 p 5-17 refs (For primary document see N85-27414 16-46)
(Contract NASw-3061)
Avail: NTIS HC A16/MF A01 CSCL 04A

In situ observations of trace reactive species in the stratosphere are presented. A balloon-borne system, floating 40 km above the Earth's surface, successfully lowered and then retracted a cluster of instruments, capable of detecting gas phase free radicals present at the part-per-trillion level, 12 km on a 1.8 mm diameter filament of Kevlar. Excellent stability of the suspended instrument array is reported as are the first observations of atomic oxygen in the stratosphere obtained with the approach. Author

N85-27416*# Harvard Univ., Cambridge, Mass. Dept. of Chemistry.
STRATOSPHERIC ClO: IN-SITU DETECTION WITH A NEW APPROACH Final Report
William H. Brune, E. M. Weinstock, M. J. Schwab, R. M. Stimpfle, and James G. Anderson *In its* Meas. of Elements in the Stratosphere 1985 p 28-41 refs (For primary document see N85-27414 16-46)
Avail: NTIS HC A16/MF A01 CSCL 04A

Stratospheric chlorine monoxide concentrations were measured in situ using a new and improved observational method in which the detection package is lowered on a tether from a balloon-borne platform floating near 40 km altitude and then reeled back up. Two reel down and reel up sequences covering 38 to 31 km produced (ClO) profiles which agree with each other to + or - 12%. The measured (ClO) profile falls within the envelope of nine previous fast parachute drop results, but exhibits a different shape, peaking near 32 km as opposed to approximately 39 km for the average of the previous profiles. These results are lower than but consistent with the profiles derived from remote sensing methods, and indicate the need for simultaneous measurements of relevant species. Author

N85-27417*# Harvard Univ., Cambridge, Mass.
THE COPPER VAPOR LASER Final Report **c36**
In its Meas. of Elements in the Stratosphere 1985 p 42-91 refs (For primary document see N85-27414 16-46)
Avail: NTIS HC A16/MF A01 CSCL 20E

The single most important free radical in the stratosphere in terms of bounding predictions of ozone depletion is the hydroxyl radical. It is particularly important to establish both the absolute concentration of OH and simultaneously the absolute concentration of H2O within the same volume element. A laser system which provides adequate detection sensitivity to yield 0.25 km resolution at any solar zenith angle is being developed. In order to achieve the required performance it was necessary to combine very high average power with low peak power. That requirement could not be met by any commercial unit, so in 1979 a copper vapor laser was developed which could pump a dye laser at a repetition rate of 20 kilohertz and achieve an average power at 5106 A of 10 watts. The results of that development through the first flight test of the system in the stratosphere are presented. B.G.

N85-27418*# Harvard Univ., Cambridge, Mass.
RESEARCH AND DEVELOPMENT OF NEW INSTRUMENTS Final Report **c35**
In its Meas. of Elements in the Stratosphere 1985 p 96-172 (For primary document see N85-27414 16-46)
Avail: NTIS HC A16/MF A01 CSCL 14B

Nitrogn dioxide is an enigma within the small molecule community in that its manifold of overlapping electronic and vibrational states yields a spectroscopic complexity comparable to molecules significantly larger. This behavior has hindered the development of optical detection techniques with sufficient sensitivity. On the other hand, NO2 stands in the rate limiting position in the catalytic couplet which is responsible for 70 percent of the globally integrated conversion of ozone to molecular oxygen. It is thus essential that a method be developed for detection NO2 within a highly confined volume element such that the detection technique is fully compatible with the other in situ methods, candidate techniques; quantification of the laser induced fluorescence technique; and design and evaluation of a prototype flight instrument are presented. B.G.

N85-27419*# Harvard Univ., Cambridge, Mass. Dept. of Chemistry.
IN-SITU STRATOSPHERIC OZONE MEASUREMENTS: RECENT RESULTS AND THEIR IMPLICATIONS Final Report
E. M. Weinstock, C. M. Schiller, and James G. Anderson *In its* Meas. of Elements in the Stratosphere 1985 p 173-201 refs (For primary document see N85-27414 16-46)
Avail: NTIS HC A16/MF A01 CSCL 04A

Recent data from BOLC have shown the convergence of data taken by research grade in situ and remote sensors in the stratosphere to be around forty kilometers. The build-up of a reliable data set invites comparisons with model calculations with the goal of evaluating ozone depletion scenarios. The unavoidable question is whether the lack of agreement is a result of uncertainties in photolysis rates, rate constants and measured profiled, coupled with inherent atmospheric variability; or is an indication of yet another missing link in the atmospheric puzzle. One approach is to enlarge the data base to the extent that a comparison can be made with a seasonally averaged model. Unfortunately, the apparent variability of water vapor, methane, and stratospheric radicals directly involved in the catalytic destruction of ozone, limits the viability of this averaging approach. On the other hand, simultaneous in situ measurements of ozone and a carefully chosen set of stratospheric radicals and source molecules can directly constrain model predictions of ozone reduction. Author

N85-27420*# Harvard Univ., Cambridge, Mass.
WATER VAPOR Final Report
In its Meas. of Elements in the Stratosphere 1985 p 202-209 refs (For primary document see N85-27414 16-46)
Avail: NTIS HC A16/MF A01 CSCL 04A

The UV-photofragment fluorescence method for in situ atmospheric H2O detection experiments were flown at night to eliminate detector background from Rayleigh scattered sunlight; and also eliminate the need for instrument walls serving as light baffles. The Bertaux flight dealt with the problem by using a light tight stainless steel chamber through which stratospheric air is forced by a turbine. Outgassing of the walls was achieved on ascent using dry stratospheric air and was measured at intervals during the flight by tuning off the turbine. While this approach allows for a daytime flight, it does not adequately remove the effect of outgassing which had to be measured with the turbine off. Since the interest is in partitioning of the hydroxyl radical between its reservoir form, H2O, and its free radical forms, OH and HO2, a simultaneous and therefore daylight measurement of OH and H2O is required. This requires an instrument which will both discriminate against solar background and yet eliminate any possible sources of H2O contamination of the sample. B.G.

N85-27421*# Harvard Univ., Cambridge, Mass.
ROLE AND FATE OF OZONE IN THE ATMOSPHERE Final Report

James G. Anderson *In its* Meas. of Elements in the Stratosphere 1985 p 211-256 refs (For primary document see N85-27414 16-46)
Avail: NTIS HC A16/MF A01 CSCL 04A

Rapid gas phase catalysis of ozone recombination to molecular oxygen by nitrogen oxides could alter stratospheric ozone concentrations. A mechanism for reducing the atmosphere's ability to screen solar ultraviolet radiation and the means for disturbing natural patterns of heating and cooling in the upper atmosphere were provided. The surface release of fluorocarbons was linked to the mid-stratospheric destruction of ozone by the catalytic reaction couplet. Photolytic decomposition of the fluorocarbon molecular augments the natural concentration of the Cl and ClO radicals, thereby accelerating the odd oxygen (ozone plus atomic oxygen) conversion to O2. The photochemical structure of the stratosphere is summarized by focussing on the free radicals which control the rate of transformation between classes of reactants within the atmosphere. B.G.

N85-27422*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SAM II MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL. VOLUME 6: APRIL TO OCTOBER 1981
M. Patrick McCormick and David Brandl (Systems and Applied Sciences Corp., Hampton, Va.) May 1985 78 p refs 6 Vol.
(NASA-RP-1141; L-15948; NAS 1.61:1141) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) II sensor is aboard the Earth-orbiting Nimbus 7 spacecraft providing extinction measurements of the Antarctic and Arctic stratospheric aerosols with a vertical resolution of 1 km. Representative examples and weekly averages of these aerosol data and corresponding temperature profiles (Apr. 1981 to Oct. 1981) are presented. Contours of aerosol extinction as a function of altitude and longitude or time are plotted and weekly aerosol optical depths are calculated. Stratospheric optical depths are 0.002 to 0.003 for the Antarctic region and 0.006 to 0.007 at the beginning to 0.003 to 0.004 at the end of the time period for the Arctic region. Polar stratospheric clouds at altitudes between the tropopause and 20 km were observed during the Antarctic winter. A ready-to-use format containing a representative sample of the sixth 6 months of data to be used in atmospheric and climatic studies is reported. Author

N85-27423*# Emmanuel Coll., Boston, Mass. Div. of Physics Research.
A STUDY OF THE GENERATION MECHANISMS OF HIGH LATITUDE AND EQUATORIAL F-REGION IRREGULARITIES USING DE-2 DATA Semiannual Report, 1 Aug. 1984 - 31 Jan. 1985
Sunanda Basu Jan. 1985 26 p refs
(Grant NAG5-456)
(NASA-CR-175745; NAS 1.26:175745) Avail: NTIS HC A03/MF A01 CSCL 04A

Characteristics of small scale (approx. 10 km and smaller) density irregularities in the various domains of the high latitude F-region in the winter (i.e., dark) hemisphere are examined. The DE-2 spacecraft has made it possible for the first time to study simultaneously on a systematic basis the spectral characteristics of not only the density irregularities but of the velocity irregularities, as well. Density irregularity spectra near auroral acceleration and shear regions have been studied using AE-D data. B.W.

N85-27424*# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
BASIC RESEARCH FOR THE GEODYNAMICS PROGRAM Semiannual Status Report, Oct. 1984 - Mar. 1985
Ivan I. Mueller Apr. 1985 22 p refs
(Grant NsG-5265; OSURF Proj. 711055)
(NASA-CR-175751; NAS 1.26:175751; SASR-14) Avail: NTIS HC A02/MF A01 CSCL 08G

The current technical objectives for the geodynamics program consist of (1) optimal utilization of laser and Very Long Baseline Interferometry (VLBI) observations for reference frames for geodynamics; (2) utilization of range difference observations in geodynamics; and (3) estimation techniques in crustal deformation analysis. G.L.C.

N85-27425*# Texas A&M Univ., College Station.
ALTIMETRY DATA AND THE ELASTIC STRESS TENSOR OF SUBDUCTION ZONES Final Report
Michele Caputo May 1985 23 p refs
(Grant NAG5-94)
(NASA-CR-175796; NAS 1.26:175796; RF-4340) Avail: NTIS HC A02/MF A01 CSCL 04A

The stress field in the lithosphere caused by the distribution of density anomalies associated to the geoidal undulations observed by the GEOS-3 and SEASAT Earth satellites in the Tonga region was studied. Different models of the lithosphere were generated with different assumptions on the density distribution and geometry, all generating a geoid profile almost identical to the observed one. The first model is the Airy isostatic hypothesis which consists of a crust of density 2.85 laying on a lithosphere of density 3.35. The models obtained with different compensation depths give residual shortwavelength anomalies of the order of several tens of mgal and several tens of meters geoidal undulations. It indicates that there is no isostasy of the Airy type in the Tonga region because the observed geoid has very smooth undulation of about 25 m over a distance of 2000 km. The Pratt isostatic hypothesis is used in a model consisting of a crust of variable density laying on a lithosphere of higher density. This model gives smaller residual anomalies but still shows that there is no isostasy of the Pratt type in the Tonga region because the observed geoidal undulation are much smaller and smoother than the residual undulations associated to the Pratt model of isostasy. E.A.K.

N85-27426*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ON THE USE OF A SUNWARD-LIBRATION-POINT ORBITING SPACECRAFT AS AN IMF MONITOR FOR MAGNETOSPHERIC STUDIES
T. J. Kelly (California Univ., Los Angeles), N. U. Crooker (California Univ., Los Angeles), G. L. Siscoe (California Univ., Los Angeles), C. T. Russell (California Univ., Los Angeles), and E. J. Smith [1984] 25 p refs
(Contracts JPL-955376; NAS7-100; NAS5-28448; Grant NsG-5351)
(NASA-CR-175809; NAS 1.26:175809) Avail: NTIS HC A02/MF A01 CSCL 04A

Magnetospheric studies often require knowledge of the orientation of the IMF. In order to test the accuracy of using magnetometer data from a spacecraft orbiting the sunward libration point for this purpose, the angle between the IMF at ISEE 3, when it was positioned around the libration point, and at ISEE 1, orbiting Earth, has been calculated for a data set of two-hour periods covering four months. For each period, a ten-minute average of ISEE 1 data is compared with ten-minute averages of ISEE 3 data at successively lagged intervals. At the lag time equal to the time required for the solar wind to convect from ISEE 3 to ISEE 1, the median angle between the IMF orientation at the two spacecraft is 20 deg, and 80% of the cases have angles less than 38 deg. The results for the angles projected on the y-z plane are essentially the same. Author

N85-27427*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ASSESSMENT OF VAS SOUNDINGS IN THE ANALYSIS OF A PRECONVECTIVE ENVIRONMENT
Anthony Mostek, Louis W. Uccellini, Ralph A. Petersen, and Dennis Chesters (General Software Corp.) Mar. 1985 64 p refs
(NASA-TM-86205; NAS 1.15:86205; Rept-85B0292) Avail: NTIS HC A04/MF A01 CSCL 04A

Retrievals from the VISSR Atmospheric Sounder (VAS) are combined with conventional data to assess the impact of geosynchronous satellite soundings upon the analysis of a preconvective environment. VAS retrievals of temperature, dewpoint, equivalent potential temperature, precipitable water, and lifted index

are derived with 60 km resolution at 3 hour intervals. When VAS fields are combined with analyses from conventional data sources, mesoscale regions with convective instability are more clearly delineated prior to the rapid development of the thunderstorms. The retrievals differentiate isolated areas in which air extends throughout the lower troposphere from those regions where moisture is confined to a thin layer near the Earth's surface. The analyses of the VAS retrievals identify significant spatial gradients and temporal changes in the thermal and moisture fields, especially in the regions between radiosonde observations. Author

N85-27428# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF THE FUNCTIONS OF SIMILARITY OF THE PLANETARY BOUNDARY LAYER. PART 1: THEORY [UM ESTUDO DAS FUNCOES DE SIMILARIDADE DA CAMADA LIMITE PLANETARIA. PARTE 1: TEORIA]
Y. Viswanadham and Julio Cesar Santos Chagas May 1984 29 p refs In PORTUGUESE Submitted for publication
(INPE-3129-PRE/520-Pt-1) Avail: NTIS HC A03/MF A01

The concept of asymptotic similarity is extended to the planetary boundary layer. Similarity functions A, B, and C of the planetary boundary layer are discussed using Rossby-number similarity theory. Simplified theoretical expressions of functions A, B, and C are used to calculate the numerical values of these functions for a wide range of atmospheric conditions seen during experiments in Koorin, Australia. B.G.

N85-27429# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF THE FUNCTIONS OF SIMILARITY OF THE PLANETARY BOUNDARY LAYER. PART 2: RESULTS [UM ESTUDO DAS FUNCOES DE SIMILARIDADE DA CAMADA LIMITE PLANETARIA. PARTE 2: RESULTADOS]
Julio Cesar Santos Chagas and Y. Viswanadham May 1984 38 p refs In PORTUGUESE Submitted for publication
(INPE-3130-PRE/521-Vol-2) Avail: NTIS HC A03/MF A01

Micrometeorological data obtained during atmospheric boundary layer testing over tropical savannah land in Koorin, Australia are used to evaluate similarity functions A, B, and C of the planetary boundary layer. Different flux-profile relationships are evaluated in the atmospheric surface boundary layer, and stability functions for boundary-layer resistance laws are discussed based on observed boundary-layer heights. The effect of baroclinicity on wind profiles and the geostrophic drag law for the convective planetary boundary layer also are considered. The results are compared with findings in the literature. The values obtained in this study are generally higher than those obtained in earlier studies. Transl. by B.G.

N85-27430# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
ATMOSPHERIC CHEMISTRY [QUIMICA DA ATMOSFERA]
V. W. J. H. Kirchhoff Jul. 1984 28 p refs In PORTUGUESE Presented at the 36th Reuniao Anual da SPBC, Sao Paulo, Brazil, 4-11 Jul. 1984
(INPE-3190-PRE/554) Avail: NTIS HC A03/MF A01

In the area above the Earth's surface characterized by the presence of particles, atoms, and molecules of various chemical elements, numerous significant chemical reactions take place. Some of these reactions are described to introduce basic chemical concepts and characteristics of the Earth's atmosphere. Production of oxygen and ozone, rates of dissociation, and concentration of particules particularly in the troposphere are discussed.
Transl. by B.G.

N85-27431# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RADON CONCENTRATION INVERSION IN THE TROPOSPHERE: STILL UNEXPLAINED
Enio B. Pereira and D. J. R. Nordemann Dec. 1984 11 p refs Submitted for publication
(INPE-3360-PRE/638) Avail: NTIS HC A02/MF A01

Vertical concentration profiles of radon in the lower troposphere were obtained in Southern Brazil and showed an unexpected inverted profile. This phenomenon was also observed in the past and was first attributed to differences in the transit time of continental air masses at different altitudes over oceanic areas. The explanation involving global scale atmospheric circulations seems not to be applicable to the experimental data. E.A.K.

N85-27432# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ELECTRIC FIELD AND ENERGY TRANSFER BY MAGNETOPAUSE RECONNECTION
W. D. Gonzalez Mar. 1985 8 p refs
(INPE-3448-PRE/701) Avail: NTIS HC A02/MF A01

Large correlation values were obtained recently between measured magnetospheric parameters and expressions for the electric field and energy transfer from the solar wind to the Earth's magnetosphere. The present work attempts to identify some of those expressions with quantities derived from large scale magnetopause reconnection theories. Further correlation studies involving dayside reconnection currents parallel to the geomagnetic field are suggested. The Svalgaard-Mansurov effect is identified as a natural consequence of the electric current transfer between the Northern and the Southern Hemispheres involved in asymmetric reconnection. B.W.

N85-27433# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
EQUATORIAL F-REGION IRREGULARITY LATITUDINAL EXTENSION AND DYNAMO ELECTRIC FIELD
O. R. Nelson (Univ. Federal do Rio Grande do Norte), M. A. Abdu, and I. S. Batista Apr. 1985 16 p refs Submitted for publication
(INPE-3494-PRE/731) Avail: NTIS HC A02/MF A01

F-layer height and ionization vertical drift evening enhancement over Fortaleza, a magnetic equatorial location in Brazil, are investigated under different circumstances of range type spread-F occurrence over that station, together with those over the low latitude location, Cachoeira Paulista. Over the latter location the spread-F seems to occur only in association with vertically extended flux tube aligned plasma bubble development over the equator. The present study shows that the threshold conditions on the F-layer height and ionization vertical drift for plasma bubble generation and growth over the equator are different from those required for the production of equatorial bottomside spread-F only. Conditions of the F-layer dynamo induced eastward electric field evening enhancements for these cases are briefly discussed.
Author

N85-27434# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DEPENDENCE OF EQUATORIAL F-REGION PLASMA BUBBLE RISE VELOCITY AND DYNAMO ELECTRIC FIELD ON SOLAR CYCLE
M. A. Abdu, O. R. Nelson, I. S. Batista, and J. H. A. Sobral Mar. 1985 16 p refs Submitted for publication
(INPE-3439-PRE/696) Avail: NTIS HC A02/MF A01

Latitudinally spaced ionosonde observations of spread F events in a restricted longitude sector of the Brazilian equatorial region has enabled determinations of statistically reliable values for the transequatorial plasma bubble vertical rise velocity. Measurements carried out of this parameter and of the F-region ambient ionization vertical drift prereversal enhancement during the past few years, 1975-1976, 1978-79 and 1980-81, show their significant dependence on sunspot cycle. Further, the spread F onset local times at the equatorial as well as at the low latitude locations are found to be delayed during low sunspot years as compared to high activity years. Implications of these results are discussed in the light of possible solar cycle in the F-region dynamo field intensity.
Author

N85-27435# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
OBSERVATIONS OF AIRGLOW O2(1-SIGMA) ATMOSPHERIC

BAND AT 8645 A AND THE ROTATIONAL TEMPERATURE AT 23 DEG S

H. Takahashi, Y. Sahai, and P. P. Batista Dec. 1984 14 p refs Presented at the 12th Ann. Meeting on Atmospheric Studies by Opt. Methods, Stockholm, 3-7 Sep. 1984

(INPE-3378-PRE/653) Avail: NTIS HC A02/MF A01

Regular observations of the O2 (1Sigma, 0 to 1) atmospheric band at 8645A (02A) and the rotational temperature, together with the OH(9,4) band and OI 5577A airglow emissions, using multichannel tilting filter type photometers, have been carried out at Cachoeira Paulista (22.7 deg D, 45. 0 deg. W) Brazil, since February 1983. The O2A band intensities occasionally vary from 200 to 1000 Rayleighs during a night. Covariations in nocturnal and seasonal variation with the OI 5577A emissions were observed. The rotational temperatures determined from the P branch of the O2 (1 sigma) vary between 180 and 230 K. The amplitude of the noctural temperature variation is frequently larger than that determined from the OH emission, and the phase of the variation, on some occasions, leads that of the OH. Author

N85-27436# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

ATMOSPHERIC RADON MEASUREMENTS IN THE ANTARCTIC PENNINSULA: A PRELIMINARY REPORT

Enio B. Pereira, D. J. R. Nordemann, and M. B. A. Vasconcellos (Institute de Pesquisas Energeticas Nucleares, Sao Paulo, Brazil) Jan. 1985 21 p refs Submitted for publication Sponsored in part by FNDCT and CIRM

(INPE-3398-PRE/667) Avail: NTIS HC A02/MF A01

During the Second Brazilian Scientific Expedition to Antarctica, some preliminary measurements of the sea level atmospheric radioactivity were performed. Radon, and radon daughter products were measured along a cruise from King George Island in the Antarctic peninsula to the Brazilian coast. An average of 2.1 + or - 1.2) pCi/cu m were obtained for radon in the Antarctic peninsula region. The Drake Passage contributed with only 1.3 + or - 0.7) pCi/cu m. Large short term fluctuations superimposed on a slow but steady concentration decrease with time emphasized the need of additional long term data for more thorough studies. The radon daughters collected on aerosol filters kept the same long term concentration decrease with time but no short term correlations were found. INAA performed on returned filters confirmed the expected preferential maritime origin of these aerosols with an average Cl/Na of 1.83. Author

N85-27437# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

X-RAY INTENSIFICATION AT BALLOON ALTITUDES OF THE SOUTH ATLANTIC MAGNETIC ANOMALY IN ASSOCIATION WITH GEOMAGNETIC ACTIVITY

O. Pinto, Jr. and W. D. Gonzalez Mar. 1985 15 p refs Submitted for publication

(INPE-3469-PRE/712) Avail: NTIS HC A02/MF A01

On April 14 and December 18, 1981, two balloon flights were performed from Sao Jose dos Campos, Brazil (geographic coordinates 23 deg 12 sec S, 45 deg 51 sec W and L approximately 1.13), each carrying an omnidirectional NaI(Tl) scintillation crystal, in order to measure bremsstrahlung X-rays due to energetic electron precipitation in the atmosphere of the South Altantic Magnetic Anomaly (SAMA), as well as to look for their relationship with geomagnetic activity. Since the April flight occurred during a time interval with an intense geomagnetic activity (the absolute value of Dst is approximately 290) whereas the December flight was conducted during a geomagnetically calm period (the absolute value of Dst is approximately or equal to 35), a comparison between these measurements shows an intensification of about .005 photons/sq.cm. sec.KeV at an atmospheric altitude of 5.5 gr/sq. cm.2 and for an energy interval of 30 to 150 KeV. This type of X-rays intensification, observed for the first time at balloon altitudes of the SAMA, is claimed to represent a direct evidence of enhanced energetic electron precipitation in association to the intensification of geomagnetic activity. Author

N85-27438# Pacific Northwest Lab., Richland, Wash.

UPPER-AIR DATA COLLECTION DURING CAPTEX Final Report

D. L. Hadley and C. G. Lindsey Jan. 1985 105 p Sponsored in part by EPRI

(Contract DE-AC06-76RL-01830; EPRI Proj. 2370-2)

(DE85-006300; EPRI-EA-3839) Avail: NTIS HC A06/MF A01; also Avail: Research Reports Center, Box 50490, Palo Alto, Calif. 94303 $13.00

A network of 10 rawinsonde upper-air stations were used during the CAPTEX-83 long range tracer experiment on atmospheric transport and diffusion on the 1000-km scale. The purpose of these upper-air stations was to increase the temporal and spatial resolution of the measurement of the winds and thermodynamic properties of the atmosphere in the boundary layer. The CAPTEX tracer target area was the northeastern US. Six of the upper-air stations were established in two triangular arrays - one in Ohio and one in central New York. The four remaining stations were located near Burlington, Vermont, State College, Pennsylvania, Andover, New Jersey and Gravenhurst, Ontario. Recommendations for improving future experiments of this type include increasing the onsite data processing capability for near-real-time data validation, providing a direct data link from the field sites to the NOAA computer facility, and determining the reliability of the CAPTEX-83 mode of operation to realistically measure the scale of atmospheric motion governing regional-scale transport phenomena. DOE

N85-27439# Pacific Northwest Lab., Richland, Wash.

EVOLUTION OF STRATOSPHERIC AEROSOL SIZE DISTRIBUTION FROM GROUND-BASED RADIOMETRIC MEASUREMENTS: A STUDY OF EL CHICHON AEROSOL

J. J. Michalsky, N. R. Larson, and N. S. Laulainen Aug. 1984 5 p refs Presented at Intern. Radiation Symp., Perugia, Italy, 21 Aug. 1984

(Contract DE-AC06-76RL-01830)

(DE85-007555; PNL-SA-12203; CONF-8408135-2) Avail: NTIS HC A02/MF A01

El Chichon erupted in late March and early April 1982, culminating with a major explosion on April 4. Aerosol optical depth measurements made continuously at 46.4(0)N from the time of the eruption until March 1984 are presented. The relationship of the observations of other measurements and the observed movement of the volcanic clouds was assessed. DOE

N85-27440# Stockholm Univ. (Sweden). Dept. of Meteorology.

THEORY AND MODELING OF THE INTERACTION BETWEEN SUBGRID SCALE OROGRAPHY AND LARGE SCALE FLOW

Aake Johansson Nov. 1984 95 p refs

(DM-43; ISSN-0349-0467) Avail: NTIS HC A05/MF A01

It is suggested that the effect of subgrid scale orography on large scale flow may be taken into account by calculating the momentum and heat flux divergences from the stationary wave field produced by mountains. Using a simple inviscid, linear internal gravity wave model it is demonstrated that the wave drag exerted on the ground for a hilly region and large scale vertical structure of the atmosphere is of the same magnitude as the boundary layer frictional stress. To calculate the mean flow deceleration, critical level absorption is considered. Inclusion of a dissipation mechanism in the governing linear wave equation may considerably alter the distribution with height of the mean flow acceleration and temperature change compared with the inviscid case. The main factor governing mean flow deceleration is the vertical structure of the large scale atmosphere. Author (ESA)

N85-27461# Cape Town Univ., Rondebosch (South Africa).

ATMOSPHERICALLY FORCED, COASTALLY TRAPPED, LONG PERIOD GRAVITY WAVES OFF THE SOUTH COAST OF SOUTHERN AFRICA Abstract Only

F. A. Shillington *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 41 (For primary document see N85-27442 16-47)

Avail: NTIS HC A04/MF A01

N85-26786# Joint Publications Research Service, Arlington, Va.
SPECTRAL CHARACTERISTICS OF PROTONS AT LOW AND HIGH ALTITUDES DURING GEOMAGNETIC STORM OF 29 JULY 1977 Abstract Only
A. S. Kovtyukh, M. I. Panasyuk, E. N. Sosnovets, and S. Ya. Reyzman *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 13 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 399-405 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26787# Joint Publications Research Service, Arlington, Va.
EXPERIMENTAL RESEARCH ON IONOSPHERIC DISTURBANCE CAUSED BY CUMULATIVE BARIUM VAPOR INJECTION Abstract Only
I. A. Zhulin, G. P. Milinevskiy, A. S. Loyevskiy, R. I. Moysya, Yu. A. Romanovskiy, Yu. Ya. Ruzhin, and V. S. Skotarovskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 13-14 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 406-412 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26788# Joint Publications Research Service, Arlington, Va.
SUBSTORMS IN ENERGETIC RADIATION BELT PARTICLES ACCORDING TO DATA FROM METEOR ARTIFICIAL EARTH SATELLITE Abstract Only
Ye. A. Ginsburg and A. B. Malyshev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 14-15 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 413-420 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26799# Joint Publications Research Service, Arlington, Va.
GLOW OF IONOSPHERIC F-LAYER IN LINE 630 NM DETERMINED FROM PHOTOGRAPHS TAKEN ABOARD SALYUT-6 ORBITAL STATION: INTERPRETATION OF RESULTS Abstract Only
I. A. Nesmyanovich, G. S. Ivanov-Kholodnyy, and G. M. Nikolskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 22-23 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 748-753 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26821# Joint Publications Research Service, Arlington, Va.
YEAR-TO-YEAR VARIABILITY OF COMPONENTS OF EARTH'S RADIATION BUDGET ACCORDING TO SATELLITE MEASUREMENT DATA Abstract Only
G. K. Marchuk, K. Ya. Kondratyev, O. A. Avaste, V. V. Kozoderov, and O. Yu. Kyarner *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 81 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 280, no. 1, Jan. 1984 p 65-70 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26822# Joint Publications Research Service, Arlington, Va.
ONE APPROACH TO REMOTE SENSING OF TOTAL OZONE CONTENT Abstract Only
G. A. Ryzhikov, M. S. Biryulina, and V. V. Rozanov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 82 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 14-20 Original language document was announced in IAA as A85-25652 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26823# Joint Publications Research Service, Arlington, Va.
SCHEME FOR ATMOSPHERIC THERMAL SENSING FROM SATELLITES WITH ENHANCED VERTICAL RESOLUTION Abstract Only
A. B. Uspenskiy, V. M. Sutovskiy, and V. Ye. Tretyakov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 82-83 Transl. into ENGLISH from Issled. Zemli iz Kosmosa (Moscow), no. 6, Nov. - Dec. 1984 p 53-58 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27026# Tohoku Univ., Sendai (Japan).
ON GRAVITATIONAL WAVES
Jiro Chiba *In its* The Record of Elec. and Comm. Eng. Conversazione, Vol. 53, No. 2, Nov. 1984 Nov. 1984 p 38-49 refs In JAPANESE; ENGLISH summary (For primary document see N85-27022 16-31)
Avail: NTIS HC A04/MF A01

N85-27286*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STATUS OF THE OBSERVATIONAL DATA SETS
S. M. Klosko and F. J. Lerch *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 66 p refs (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 08B

N85-27292*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RADIAL ORBIT ERROR SPECTRUM FOR TOPEX
Carl A. Wagner *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 70 p refs (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 08B

N85-27293*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE SIZE OF A GRAVITATIONAL FIELD MODEL FOR TOPEX
Oscar L. Colombo *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 9 p (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 08B

N85-27294*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE SELECTION OF THE STARTING FIELD: GENERAL VERSUS TAILORED MODEL
F. S. Lerch, C. A. Wagner, O. L. Colombo, S. M. Klosko, and R. G. Williamson *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 11 p (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 08B

N85-27295*# Texas Univ., Austin. Center for Space Research.
COMPARISON OF GRAVITY FIELD SOLUTION TECHNIQUES
In NASA. Goddard Space Flight Center Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 6 p (For primary document see N85-27285 16-42)
(Contract JPL-956689)
Avail: NTIS HC A14/MF A01 CSCL 08B

N85-27296*# Texas Univ., Austin. Center for Space Research.
OPTIMAL RELATIVE DATA WEIGHTS
In NASA. Goddard Space Flight Center Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 9 p refs (For primary document see N85-27285 16-42)
(Contract JPL-956689)
Avail: NTIS HC A14/MF A01 CSCL 08B

N85-27297*# Texas Univ., Austin. Center for Space Research.
ATMOSPHERIC DENSITY MODEL
In NASA. Goddard Space Flight Center Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 17 p ref (For primary document see N85-27285 16-42)
(Contract JPL-956689)
Avail: NTIS HC A14/MF A01 CSCL 04A

N85-27299*# Texas Univ., Austin. Center for Space Research.
STATION COORDINATES AND EARTH ROTATION PARAMETERS FROM LAGEOS LASER RANGING
In NASA. Goddard Space Flight Center Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 21 p refs (For primary document see N85-27285 16-42)
(Contract JPL-956689)
Avail: NTIS HC A14/MF A01 CSCL 08B

N85-27303# Joint Publications Research Service, Arlington, Va.
ORGANIZING GEOLOGICAL WORK TASKS FOR 1985 OUTLINED
Wen Jiabao *In its* China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 72-77 refs Transl. into ENGLISH from Zhongguo Dizhi (Beijing) no. 2, 13 Feb. 1985 p 1-4 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

N85-27312# Joint Publications Research Service, Arlington, Va.
INTERNAL WAVES IN LAYERS OF EARTH'S UPPER MANTLE Abstract Only
R. M. Gadzhiyev and F. A. Kadirov *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 35 Transl. into ENGLISH from Izv. Nauk Azerb. SSR, Ser. Nauk o Zemle (Baku), no. 2, 1984 p 98-104 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

N85-27314# Joint Publications Research Service, Arlington, Va.
TURBOPAUSE AS SOURCE OF INTERNAL GRAVITY WAVES Abstract Only
Yu. Karadzhayev and A. Mukhametnazarova *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 100 Transl. into ENGLISH from Izv. Akad. Nauk Turkm. SSR, Ser. Fiz.-Tekhn., Khim. i Geol. Nauk (Ashkhabad), no. 5, 1984 p 32-36 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

N85-27315# Joint Publications Research Service, Arlington, Va.
STUDY OF SPATIAL DISTRIBUTION OF AURORAS Abstract Only
Yu. K. Krakovetskiy, Yu. A. Nadubovich, L. N. Popov, and N. A. Shumilov *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 101 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 279, no. 3, Nov. 1984 p 580-582 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

N85-27316# Joint Publications Research Service, Arlington, Va.
FULL SHADOW PHENOMENON IN EARTH'S UPPER ATMOSPHERE Abstract Only
A. G. Kolesnik and I. A. Golikov *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 101-102 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 279, no. 4, Dec. 1984 p 832-834 Original language document was announced in IAA as A85-20083 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N85-27441# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
FLUID-DYNAMIC MODEL OF A DOWNBURST
Shangxiang Zhu and Bernard Etkin Apr. 1983 47 p ref
(UTIAS-271; CN-ISSN-0082-5255) Avail: NTIS HC A03/MF A01

The downburst phenomenon associated with thunderstorms produces a flow like that of a jet directed vertically downward at the ground. The flow field near the ground has been modelled as a classical ideal fluid flow generated by a suitable singularity distribution. The resulting model of vertical, lateral and horizontal winds near the ground is useful for studying landing and takeoff of airplanes under thunderstorm conditions. It is used both for analysis, and for on-line real time simulation. With the model developed, analytical simulations of a large jet transport landing through a microburst were carried out on a digital computer. The wind fields generated confirm that phugoid resonance can occur, and is a hazardous condition. Author

N85-27442# National Physical Research Lab., Pretoria (South Africa).
SYMPOSIUM ON ATMOSPHERIC SCIENCES IN SOUTH AFRICA Abstracts Only
1983 55 p Symp. held in Pretoria, 18-20 Oct. 1983
(CSIR-S-331) Avail: NTIS HC A04/MF A01

Abstracts of papers dealing with various aspects of atmospheric science are presented. Topics covered include weather forecasting, meteorology, atmospheric modeling, environmental modeling and air pollution. For individual titles, see N85-27443 through N85-27462.

N85-27443# Witwatersrand Univ., Johannesburg (South Africa). Nuclear Physics Research Unit.
ELEMENTAL ANALYSIS OF AEROSOLS IN TRANSVAAL URBAN AND POWER-PRODUCING AREAS USING TIME AND SIZE-RESOLVED SAMPLES Abstract Only c45
H. J. Annegarn *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 1 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

The study of atmospheric pollution often requires information on the size distribution, composition and temporal variation of the particulate phase. The use of low volume (1 l/m) samplers, i.e., single orifice cascade impactors and circular streaker filter samplers will be described. These samples are well suited to analysis by Particle Induced X-ray Emission analysis (PIXE), which typically detects 10 to 15 elements in environmental atmospheric samples. Author

N85-27444# ESCOM, Cleveland (South Africa). Environmental Test and Research.
ACID RAIN: TOWARDS AUTOMATED MONITORING Abstract Only c45
Margaret Boehm *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 2 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

Acid Rain has been recognized as one of the major world wide environmental concerns. Scientists have recently begun to question the techniques chosen for the collection of data on rain acidity and composition. The design of an automated process for the monitoring of rain acidity is presented. Emphasis is placed on minimizing biases introduced to the data during collection, pH measurement and storage of rain samples for later chemical analyses. Author

N85-27445# Weather Bureau, Bethlehem (South Africa).
ICE MULTIPLICATION IN SUMMERTIME CUMULUS CLOUDS IN THE BEWMEX AREA Abstract Only
R. T. Bruintjes *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 6 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

Observations in natural clouds have shown that the concentrations of ice particles are sometimes much greater than the measured concentrations of ice nuclei. In addition, identification of the origins of ice and ice multiplication processes in natural clouds is extremely important to any weather modification effort like BEWMEX and PAWS which plans to artificially increase cloud glaciation. G.L.C.

N85-27446# Cape Town Univ., Rondebosch (South Africa). Dept. of Physical Oceanography.
THE SEA LEVEL RESPONSE TO WEATHER ALONG THE COAST OF SOUTHERN AFRICA Abstract Only
G. B. Brundrit *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 7 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

Low frequency fluctuations in sea level in coastal regions can be associated with local wind and atmospheric pressure, with regular seasonal adjustment of oceanographic conditions, and with intermittent remote forced phenomena on various time scales. The relative contribution of these effects differ on the west coast, the south coast and the east coast. Linear statistical estimators, in particular principal components analysis, is used to examine monthly mean sea level data obtained from tide gauge records at various sites along the southern African coast. Correlations with atmospheric pressure, sea surface temperature, and winds are used to highlight regional differences. G.L.C.

N85-27447# National Physical Research Lab., Pretoria (South Africa). Atmospheric Sciences Div.
THE SEASONAL CYCLE OF ATMOSPHERIC CO IN THE SOUTHERN HEMISPHERE Abstract Only
E. G. Brunke *In its* Symp. on Atmospheric Sci. in South Africa 1983 p 8 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

The abundance of CO in the troposphere is of considerable importance to atmospheric chemistry, because it is the major remover of OH, which is a scavenger for many pollutants. A four year data base (1979-1982) of continuous CO measurements is now available for Cape Point. Measurements made in polluted air masses are recognized by a disturbed CO trace and have been removed from the global data set. On the basis of these background measurements, the annual mean CO mixing ratio corresponds to 67 ppbV showing no sign of an increase with time. G.L.C.

N85-27448# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
GENERAL CONTINUOUS FORMULATIONS OF ATMOSPHERIC ENERGY LAWS Abstract Only
Alewyn P. Burger and Hilarie A. Riphagen *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 9 In AFRIKAANS and ENGLISH (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

The hyrodynamical equations on the rotating globe, presented with reasonable mathematical rigor but for simple physics, are used to discuss energy conservation and conversion. The equations are formulated as if the Earth and geopotential surfaces are spherical, but with the required dynamics to distinguish between true horizontal and vertical behavior. The simplest physical properties are assumed, viz, an ideal gas with no moisture, diabatic heating, heat conduction, friction or turbulence. The basic equations and boundary conditions are given first with geometrical height as vertical coordinate and then with a general vertical coordinate. Also the equations for energy conservation and conversion are given for a general vertical coordinate. Author

N85-27449# Natal Univ., Durban (South Africa). Dept. of Chemical Engineering.
A WIND-BIVANE/MICROPROCESSOR SYSTEM FOR ON-LINE PREDICTION AND DISPLAY OF POLLUTANT DISTRIBUTIONS Abstract Only c45
L. W. Burger *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 10 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

An on-line pollutant distribution prediction system has been developed whereby the ground level pollutant concentration distribution for a specific region of interest is displayed on a VDU screen. This is in the form of different colors for selected concentration range. The system consists of a 64K microprocessor, a color VDU screen, an anemometer bivane, and a control panel for changing certain model parameters and output options. G.L.C.

N85-27450# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Agrometeorology.
A WEATHER SERVICE FOR AGRICULTURE Abstract Only
J. M. deJager and J. M. Venter *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 11 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

Details required to create and operate a meaningful weather service for agriculture are given. The present service is designed to meet the needs of the Orange Free State and Cape North of the Orange River. A calendar listing the most important crop production activities subject to weather influence was developed. This crop calendar is used together with S.A. Weather Bureau forecasts to provide the basis for a telephonic weather advisory service to farmers. The service is utilized approximately 170 times per month. G.L.C.

N85-27451# Cansas International Corp. (Proprietary) Ltd. (South Africa).
THE DEVELOPMENT AND APPLICATION OF VOLUME SCAN AND CELL TRACKING CAPABILITIES FOR THE ANALYSIS OF CONVECTIVE CLOUD SYSTEMS Abstract Only
M. J. Dixon *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 14 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

The Nelspruit 5 cm radar has been converted to operate in volume scan mode. Since the radar is controlled by the computer, scan modes can be selected by the operator through the computer terminal. Two modes were used throughout the 1982/83 season, a full volume scan and sector scans. In both instances, the antenna was stepped in 1 deg elevation increments from 3 deg to 20 deg. The raw video data is integrated (8 integrations) and stored on magnetic tape in bins 1 degree by 1 degree by 0.6 km. G.L.C.

N85-27452# Cape Town Univ., Rondebosch (South Africa). Energy Research Inst.
EFFECT OF TRAFFIC AND METEOROLOGY ON AIR POLLUTION Abstract Only c45
R. K. Dutkiewicz *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 15 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

The important factors in an assessment of the effects of traffic on pollution are vehicle emission concentrations, driving patterns, traffic density and meteorology. The meteorological factors of interest are those affecting dispersion and those affecting solar insolation, which is a primary parameter in the formation of photochemical smog. Except in very windy areas dispersion in urban areas is poor because of the relatively stagnant nature of air in city streets. Vehicle emissions in the early morning rush hour result in high levels of unburnt or partially burnt hydrocarbons, and of the oxides of nitrogen. These emissions, in the presence of solar radiation, are converted to various compounds making up photochemical smog. The concentration of photochemical smog is directly related to the precursor concentrations and thus to traffic density, and to the incident ultra-violet radiation. In addition to traffic density the concept of driving pattern is important since total emissions are a function of the speed-time relationship of each vehicle. E.A.K.

N85-27453# Weather Office, Jan Smuts Airport (South Africa).
THE STUDY OF THERMAL FORECASTING FOR GLIDING Abstract Only
M. Edwards *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 16 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

A definition of thermal is given. A thermal is a volume of air at a higher temperature than the surrounding air and rising from the surface. The difference between dry and cloudy thermals are outlined: (1) dry thermals are stable layers before condensation is reached and very dry low level atmosphere; (2) cloudy thermals; are sub-cloud layers, spreading out of cumulus, cloud streams and streets and group structures. The thermal as a vertical distribution of the velocities and the diameter and frequency in encountering usable thermals is described. Factors affecting the

thermal strength and calculation of thermal strengths are presented. E.A.K.

N85-27454# Weather Bureau, Pretoria (South Africa).
FOG ADVECTION IN THE NAMIB Abstract Only
K. E. Estie *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 17 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

Because of the high incidence of fog during the month of September, fog occurrences during September 1980 were studied. Synoptic forcing dominated the occurrence of stratus and advection fog. The circulation south of the center of this system, was off-shore and clear of cloud. To the north and west fog and stratus were observed. The movement of the coastal low was largely influenced by the movement and development of the Atlantic high pressure system. With the movement of the high across the coast, fog and stratus advected inland initially from the south-west but the flow rapidly tended off-shore with resultant clearing. Approximately one third of the fog events occurred with weak synoptic influences during which the systematic progression of fog into the interior could be discerned. During dominant synoptic conditions, advection inland occurred in the form of a stratus influex with cloudbase systematically lowering and the onset of fog was recorded at stations in order of decreasing elevation. E.A.K.

N85-27455# Water Research Commission, Bethlehem (South Africa).
THE USE OF RADAR IN DETERMINING PRECIPITATION PROCESSES IN THE BEWMEX AREA Abstract Only
S. L. M. Fleischer *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 18 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

Radar and cloud physics data, gathered in summertime cumulus clouds are used to determine if radar can point to dominant precipitation processes in the BEWMEX area. Case studies, viz two test-cells that occurred on the same day are presented. Cloud physics data, which includes liquid water content, 1D and 2D-data, and particle images, are studied for each penetration of a test-cell and compared to the vertical cross-section (time-height-diagram) of the rad echo. The first two levels represent the most important region concerning the initiation of precipitation processes. Changes of the clouds' microphysics to changes in radar reflectivity and vertical growth are correlated. E.A.K.

N85-27456# Water Research Commission, Pretoria (South Africa).
EFFECTS OF CLOUD SEEDING ON PRECIPITATION DEVELOPMENT IN CUMULUS CLOUDS Abstract Only
D. R. Hudak *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 26 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

Precipitation formation on two contrasting days is summarized. Development on the first day occurred in a very moist tropical airmass with strong synoptic scale convergence to 40 kpa. Studies of a natural cloud on this day showed large quantities of supercooled liquid water present but only small amounts of ice crystals during the early stages of its lifetime. A heavily seeded cloud on this day had a relatively warm first echo, with the highest growth rate of any echo on that day. On the second day cumuli developed due to surface heating as mid latitude air pushed into the area behind a very sharp cold front. Cloud base measurements indicated a much more maritime droplet spectra. Heavy seeding caused an overabundance of ice crystals and inhibited precipitation development. It is suggested that a lower seeding rate could possibly have had a positive effect on the growth of precipitation sized particles. The complex nature of dynamics microphysics interactions and that both must be accommodated in formulating a seeding hypothesis for precipitation enhancement. E.A.K.

N85-27457# Natal Univ., Pietermaritzburg (South Africa). Dept. of Geography.
PRECIPITABLE WATER IN THE ATMOSPHERE, DETERMINED FROM SURFACE DEWPOINT VALUES Abstract Only
O. S. McGee *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 31 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

Ten years' of daily ascent data at South African upper-air stations were analyzed to produce simple regression equations predicting precipitable water from dewpoint temperature. It is suggested that changes in the moisture profile require a time scale smaller than monthly investigation, despite the fact that a reduced degree of correlation between precipitable water and dewpoint, and therefore less reliable estimates, must then follow. E.A.K.

N85-27458# Natal Univ., Durban (South Africa). Dept. of Chemical Engineering.
USE OF A NETWORK OF TELEMETERED METEOROLOGICAL STATIONS FOR PREDICTION OF THE DISTRIBUTION OF AN ATMOSPHERIC TRACER Abstract Only
M. Mulholland *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 33 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

Ten semiportable masts were instrumented for wind direction, speed and temperature at the 11.2 m level, and for wind-speed and temperature at the 1.9 m level. The measure to obtain spatial and temporal definition of the wind-field and stability. Experimental runs aimed to measure wind-field and atmospheric dispersion behavior during stable conditions resulting from nocturnal inversions in winter. The on-line wind data allowed optimum positioning of 10 portable aspirated filter units to define the tracer distribution. It is shown that the wind-field could not be modelled accurately on the basis of continuity and potential flow, owing to the migration of temporal transients across the region. However, wind and stability data are used directly by inverse-square interpolation, to predict tracer dosages using a sheared puff model. Comparison with a Gaussian Puff model reveal the important effect of temporal variations in redistributing airborne material. E.A.K.

N85-27459# Sea Fisheries Research Inst., Cape Town (South Africa).
AIR FLOW OF THE WESTERN COASTAL BOUNDARY OF SOUTH AFRICA AND ITS INFLUENCE ON THE OCEAN Abstract Only
G. Nelson, F. Kamstra, and N. Walker *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 34 (For primary document see N85-27442 16-47)
Avail: NTIS HC A04/MF A01

The western coastal boundary of South Africa is influenced by five classes of atmospheric events. Ambient longshore flow occurs, driven by geostrophic winds associated with the South Atlantic High pressure cell. This flow is subject to four types of perturbation. Cyclonic systems passing south of the continent with differing orientations can affect the entire coastal area from Cape Point to the Orange River but in their weakest form their influence may extend only as far north as Lamberts Bay. An appreciable component of westerly flow is observed. North of Lamberts Bay, longshore flow is modulated by the periodic formation and southward migration of coastal low pressure cells. This zone and that between Yzerfontein and Cape Town are also influenced by a strong land-sea breeze. When a subcontinental high pressure cell sets in, berg winds blow offshore along most if not all of the western coast. Large changes in integrated Longshore and cross coastal summer wind displacements were found to occur along the southwest coast. The 1982/83 summer was anomalous and considerably less northward wind displacement occurred with a corresponding reduction of upwelling. The summer marine climatology between the Orange River and Cape Agulhas is examined to illustrate the cause and effect of ocean-atmosphere interactions over the upwelling regions. E.A.K.

N85-27460# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

A SPLIT EXPLICIT MODEL FOR SHORT-TERM NUMERICAL WEATHER PREDICTION Abstract Only

H. A. Riphagen *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 38 (For primary document see N85-27442 16-47)

Avail: NTIS HC A04/MF A01

Dynamic meteorology is based on the classical laws of conservation of mass, energy and momentum expressed in mathematical form as a set of nonlinear partial differential equations. Together with the ideal gas equation and an equation for water vapor, they constitute a mathematically complete set of seven equations in seven unknowns and, in their general form, take account of all scales of motion present in the atmosphere. The hydrostatic primitive equations describes a model atmosphere in which gravity and large-scale meteorological waves are permitted. These equations are solved numerically and, usually, derivatives are replaced by finite differences, calculated at the mesh-points of a three-dimensional lattice filling the atmosphere, at fixed intervals of time. The primitive equations are used in a five-level hemispheric prediction model. The model incorporates a split explicit formalism. In the natural splitting method the large-scale advective (or transport) processes and the small-scale adjustment processes are dealt with in separate stages. Specially tailored numerical methods are employed in each stage and it is found possible to use a longer time step for the advection stage. E.A.K.

N85-27461# Cape Town Univ., Rondebosch (South Africa).

ATMOSPHERICALLY FORCED, COASTALLY TRAPPED, LONG PERIOD GRAVITY WAVES OFF THE SOUTH COAST OF SOUTHERN AFRICA Abstract Only **c46**

F. A. Shillington *In* National Physical Research Lab. Symp. on Atmospheric Sci. in South Africa 1983 p 41 (For primary document see N85-27442 16-47)

Avail: NTIS HC A04/MF A01

An examination of tidal records from stations on the south coast of southern Africa revealed a Tsunami like disturbance on 11 May 1981. The phenomenon is manifest as a long period wave propagating from west to east abruptly and having a maximum crest to trough elevation of 50 cm. Microbarograph records of air pressure fluctuations revealed a small amplitude, short period atmosphric pulse which propagated above the south coast with an average speed of 17 m/s. The disturbance in the sea, first identified as a Tsunami, are explained in terms of coastal trapped edge waves, generated by unusual, short period, air pressure oscillations. The event of 11 May 1981 is unusual in that the oscillations measured at the tide gauge locations were rather large and showed distinct starting times. This allowed the generation area to be identified together with a reasonable explanation of the dynamics of the waves. Further atmospheric pulses were identified on barograph records, and more cases of coastally trapped waves are discussed. E.A.K.

N85-27462# National Physical Research Lab., Pretoria (South Africa). Atmospheric Sciences Div.

GROUND-BASED REMOTE SENSING OF ATMOSPHERIC POLLUTION Abstract Only **c45**

R. G. VonGogh *In its* Symp. on Atmospheric Sci. in South Africa 1983 p 50 (For primary document see N85-27442 16-47)

Avail: NTIS HC A04/MF A01

Electro-optical techniques were developed for the remote sensing of pollutants from stationary sources. The ultraviolet absorption spectrometer which is capable of measuring the atmospheric burden of SO2 and NO2 by comparing the magnitudes of peaks and troughs in the absorption spectra of these gases were employed. By employing the instrument in the mobile, vertically-looking mode it is possible to obtain information on plume geometry and in combination with wind speed information, pollution emission rates. Emission inventories may be compiled for areas where accurate emission statistics are not available. The variability of plume characteristics under differing atmospheric conditions are shown and the possible impact of emissions from diverse sources on ground-level pollution concentrations are assessed. E.A.K.

N85-27463*# Pacific Northwest Lab., Richland, Wash.

ANALYSIS OF THE NASA/MSFC AIRBORNE DOPPLER LIDAR RESULTS FROM SAN GORGONIO PASS, CALIFORNIA Contractor Report, 1 Oct. 1982 - 31 Dec. 1984

W. C. Cliff, J. R. Skarda, D. S. Renne, and W. F. Sandusky Washington NASA May 1985 71 p refs

(Contract NAS8-34733)

(NASA-CR-3901; NAS 1.26:3901; M-489) Avail: NTIS HC A04/MF A01 CSCL 04B

The NASA/MSFC Airborne Doppler Lidar System was flown in July 1981 aboard the NASA/Ames Convair 990 on the east side of San Gorgonio Pass California, near Palm Springs, to measure and investigate the accelerated atmospheric wind field discharging from the pass. At this region, the maritime layer from the west coast accelerates through the pass and spreads out over the valley floor on the east side of the pass. The experiment was selected in order to study accelerated flow in and at the exit of the canyon. Ground truth wind data taken concurrently with the flight data were available from approximately 12 meteorological towers and 3 tala kites for limited comparison purposes. The experiment provided the first spatial data for ensemble averaging of spatial correlations to compute lateral and longitudinal length scales in the lateral and longitudinal directions for both components, and information on atmospheric flow in this region of interest from wind energy resource considerations. Author

N85-27464*# Colorado Univ., Boulder.

THE PROBLEM OF ATMOSPHERIC TURBULENCE Final Report

Toomre, Hill, Merryfield, and Gough 14 Apr. 1984 28 p refs Sponsored by NASA Prepared for JPL

(NASA-CR-175783; JPL-9950-1091; NAS 1.26:175783) Avail: NTIS HC A03/MF A01 CSCL 04B

All ground-based observations of the solar five-minute oscillations are affected by turbulence in the Earth's atmosphere that leads to substantial refractive index variations. The turbulent motions serve to mix an air mass that is thermally stratified in the vertical, thereby producing intermittent thermal fluctuations over a wide range of heights in the atmosphere. These thermal structures yield refractive index changes that deflect the light path in a complicated way, producing intricate variations of amplitude and phase in what might have started out as simple plane waves. Since the fluid turbulence is statistical in nature, so too is the optical turbulence which is an integral measure of the refractive index changes along the light travel path. All of this produces what is usually called atmospheric seeing, which consists of image motion, blurring and distortion across the field of view. The effects of atmospheric seeing upon observations of five-minute oscillations carried out from the ground were assessed. This will help to provide a baseline estimate of the scienctific benefits that might accrue if one were able to observe the same oscillations from a space observatory unfettered by seeing effects. G.L.C.

N85-27465*# Stanford Univ., Calif. Lab. of Physics.

CONDUCTING A WIND SENSING STUDY Final Technical Report, 31 Dec. 1983 - 30 Dec. 1984

Robert L. Byer Mar. 1985 27 p refs Sponsored by NASA Prepared for JPL

(NASA-CR-175782; JPL-9950-1098; NAS 1.26:175782; SU-GL-3821) Avail: NTIS HC A03/MF A01 CSCL 04B

Signal-to-noise requirements, and how signal-to-noise determines wind velocity measurement accuracy were studied. A Nd:YAG-based system was found to be competitive with a CO2-based system. Hardware was developed for a coherent Nd:YAG LIDAR system, and is being integrated into a functioning system. A diode-pumped monolithic rod laser to be used as a reference oscillator, a high-power, single-mode ring laser, for use as a master oscillator, and a high-gain, multipass amplifier were constructed. A.R.H.

N85-27466*# S M Systems and Research Corp., Lanham, Md.

VALIDATION OF THE ERBE SCANNER SCENE IDENTIFICATION METHODOLOGY: ANALYSIS WITH NIMBUS-7 ERB DATA

Final Report
Sastri Vermury Mar. 1985 69 p refs
(NASA Order L-67978-B)
(NASA-CR-172596; NAS 1.26:172596; SMSRC-7-85) Avail: NTIS HC A04/MF A01 CSCL 04B

Maximum Likelihood Estimation (MLE) procedure for scene identification currently being utilized in the ERBE scanner data processing stream is applied to the Nimbus-7 ERB Scanner data for the month of June 1979. The Earth radiation budget parameters derived using MLE method show very good agreement with the values provided using sorting into angular bins (SAB) method. Results of the fields on different spatial scales are presented. A satellite zenith angle study indicates that the MLE procedure considerably improves the scene selection over the method of bispectral thresholds applied in the Nimbus-7 ERB data processing. Agreement with SAB results improved further when the observations were cut off at 75% in satellite zenith. Sampling constraints, however require that the cut-off angle should not be lower than 70%. Quantitative details about the reliability of the scene identification are also presented. Author

N85-27467*# Simpson Weather Associates, Charlottesville, Va.
INFLUENCE OF COHERENT MESOSCALE STRUCTURES ON SATELLITE-BASED DOPPLER LIDAR WIND MEASUREMENTS Progress Report for period ending May 1985
G. D. Emmitt May 1985 14 p
(Contract NAS8-35597)
(NASA-CR-175853; NAS 1.26:175853) Avail: NTIS HC A02/MF A01 CSCL 04B

The influence of coherent mesoscale structures on satellite based Doppler lidar wind measurements was investigated. Range dependent weighting functions and the single shot SNR of scan angle are examined and a space shuttle lidar experiment which used a fixed beam and rotating shuttle is simulated. E.A.K.

N85-27468*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A MODELING ANALYSIS PROGRAM FOR THE JPL TABLE MOUNTAIN IO SODIUM CLOUD Annual Report, 1 Jun. 1984 - 31 May 1985
William H. Smyth (Atmospheric and Environmental Research, Inc.) and Bruce A. Goldberg Jun. 1985 36 p refs
(Contract NASw-3949)
(NASA-CR-175851; NAS 1.26:175851) Avail: NTIS HC A03/MF A01 CSCL 04B

Progress and achievements in the first year are discussed in three main areas: (1) review and assessment of the massive JPL Table Mountain Io sodium cloud data set, (2) formulation and execution of a plan to perform further processing of this data set, and (3) initiation of modeling activities. The complete 1976-79 and 1981 data sets are reviewed. Particular emphasis is placed on the superior 1981 Region B/C images which provide a rich base of information for studying the structure and escape of gases from Io as well as possible east-west and magnetic longitudinal asymmetries in the plasma torus. A data processing plan is developed and is undertaken by the Multimission Image Processing Laboratory of JPL for the purpose of providing a more refined and complete data set for our modeling studies in the second year. Modeling priorities are formulated and initial progress in achieving these goals is reported. Author

N85-27469*# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
ATMOSPHERIC FRONTAL ZONE STUDIES Final Report, 1 Feb. 1976 - 30 Apr. 1984
D. H. Staelin, W. T. Baumann, T. S. Bigelow, P. W. Rosenkranz, and Xi-ru Xu 15 Jun. 1984 8 p
(Contract NAS5-22929)
(NASA-CR-175293; NAS 1.26:175293) Avail: NTIS HC A02/MF A01 CSCL 04B

The research supported by this contract and directed Activities in the inversion and interpretation of data produced by the Nimbus-7 scanning multichannel microwave radiometer (SMMR) are reported. There were five principal subjects: (1) modeling of the emissivity of foam patches on the ocean surface; (2) inversion of radiometric data by a multidimensional algorithm; (3) an operational water vapor retrieval algorithm; (4) inference of Antarctic firn accumulation rates; and (5) inference of water vapor over the Arctic sea ice. M.G.

N85-27470# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
FORECAST OF ATLANTIC SEASONAL HURRICANE ACTIVITY FOR 1985
William M. Gray 28 May 1985 34 p refs
Avail: NTIS HC A03/MF A01

A forecast of the number of tropical cyclone activity which is expected to occur in the Atlantic Ocean region (including the Caribbean Sea and the Gulf of Mexico) in 1985 is discussed. This forecast is based on the seasonal amount of Atlantic tropical cyclone activity due to four factors: (1) the El Nino (EN); (2) the quasi-biennial oscillation of equatorial stratospheric wind (QBO); (3) Caribbean Basin and Gulf of Mexico sea-level pressure anomaly (SLPA); and (4) lower latitude Caribbean Basin 200 mb zonal wind anomaly. It is indicated that the 1985 hurricane season can be expected to be an above average year with about 8 hurricanes, 11 hurricanes and tropical storms, and about 35 hurricane days. The methodology of this objective forecast scheme is described. Reasons for the usually low amount of hurricane activity which has occurred in the last three seasons are discussed. E.A.K.

N85-27471*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A SURVEY OF MAJOR EAST COAST SNOWSTORMS, 1960-1983. PART 2. SUMMARY OF SURFACE AND UPPERLEVEL CHARACTERISTICS
Paul J. Kocin and Louis W. Uccellini Mar. 1985 107 p refs
(NASA-TM-86195; NAS 1.15:86195) Avail: NTIS HC A06/MF A01 CSCL 04B

Surface and upper-level characteristics of selected meteorological fields are summarized. Two major types of sea level development are described and applied to the cases at hand, with a few storm systems showing characteristics of both types. Aspects such as rapid sea level deepening, coastal frontogenesis, cold air damming, low level jet formation, the development of an S-shaped isotherm pattern, diffluence downwind of a negatively tilted upper level trough axis, upper level confluence and an increase of geopotential heights at the base of the upper level trough characterized the pre-cyclogenetic and cyclogenetic periods of many of the storm systems. Large variability was also observed, especially with regard to the spatial dimensions of the surface and upper level systems, as well as variations in trough/ridge amplification and the evolution of upper level jet streak systems. The influence of transverse circulations associated with a confluent jet streak entrance region and the diffluent exit region of a jet streak/trough system on the production of snowfall is also discussed. Author

N85-27472*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A SURVEY OF MAJOR EAST COAST SNOWSTORMS, 1960-1983. PART 2: CASE STUDIES OF EIGHTEEN STORMS
Paul J. Kocin and Louis W. Uccellini Mar. 1985 219 p refs
(NASA-TM-86196; NAS 1.15:86196) Avail: NTIS HC A10/MF A01 CSCL 04B

Snowfall, surface and upper air charts, and available satellite images are presented for eighteen major East Coast snowstorms that occurred between 1960 and 1983. The charts and descriptions of key fields are provided so that students, weather forecasters, and researchers alike can visualize how a large sample of major winter cyclones form and intensify. Although there are noted similarities in certain aspects of the surface and upper tropospheric development of the storms, significant case-to-case variability precludes the ability to effectively composite these weather systems. Author

N85-27473# Finnish Meteorological Inst., Helsinki.
EVALUATION OF THE AREA AND SEVERITY OF LAST NIGHT'S FROSTS
Reijo Solantie 1983 29 p refs In FINNISH; ENGLISH summary (Rept-109; ISBN-951-697-201-2; ISSN-0355-1717) Avail: NTIS HC A03/MF A01

A method for evaluating the area and the severity of summer frosts in Finland was laid out. The nightly minimum temperatures at the screen level (2 m above ground) are first corrected to be representative of the cultivated areas of average sensitiveness to frost damage by adding a constant to the observed value. This constant was calculated as the climatological difference between the areal mean and the station value of the nightly minimum temperatures. This difference was calculated as the mean value of its two approximations, one based on the mean of the lowest monthly temperatures in June, July and August in the period 1961 - 1975 and the other on the daily minimum temperature during the summers of this period. The areas are determined on their general sensitiveness to frost, based both on the physical background and temperature statistics. Such representative screen level values were further corrected by adding constants to them in order to obtain other parameters. Author

N85-27474# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A GRAPHIC SYSTEM FOR DRAWING SYNOPTIC MAPS BY COMPUTER [SISTEMA GRAFICO PARA O TRACADO DE CARTAS SINOTICAS POR COMPUTADO]
Sergio Roberto Matiello Pellegrino and Jose Antonio Goncalves Pereira Jul. 1984 21 p In PORTUGUESE Presented at the 17th Congr. Nacional de Informatica, Riocentro, Brazil, 5-11 Nov. 1984
(INPE-3215-PRE/568) Avail: NTIS HC A02/MF A01

A graphic computer system developed to draw synoptic charts and to store meteorological data in a data base at the Institute of Space Research is described. The system, SINOGRAFO, was used to trace the contour of South America and international boundaries as part of the Mercator project and to provide information of wind velocity, air pressure, humidity, temperature, cloud cover, past and present weather, and amount of precipitation. The synoptic maps that were generated show the distribution of meteorological conditions existing over a wide region at a given moment. B.G.

N85-27475# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SINOGRAFO: A SYSTEM FOR INFLUENCING AND FORECASTING WEATHER [SINOGRAFO: UM PACOTE PARA O AUXILIO A PREVISAO DE TEMPO]
Sergio Roberto Matiello Pellegrino and Jose Antonio Goncalves Pereira Nov. 1984 10 p refs In PORTUGUESE Presented at the 5th Seminario ADUNESP-Guaratingueta, Guaratingueta, Brazil, 22-27 Oct. 1984
(INPE-3349-PRE/628) Avail: NTIS HC A02/MF A01

A system is described that was developed at the Institute of Space Research to draw synoptic charts by computer. The charts show the distribution of meteorological conditions existing over a wide region at a given time. In this study, SINOGRAFO was used to trace the contour of South America and to provide information on wind velocity, air pressure, temperature, humidity, cloud formations, past and present weather, and amount of precipitation. Meteorological data are inputted into the data base at the Institute of Space Research, where they can be retrieved on demand. Transl. by B.G.

N85-27476# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ON THE 1983 DROUGHT IN NORTHEAST BRAZIL
V. BrahmanandaRao, P. Satyamurty, and Jose Ivaldo B. deBrito Feb. 1985 25 p refs Submitted for publication
(INPE-3412-PRE/678) Avail: NTIS HC A02/MF A01

Examination of the rainfall data for North (NE) Brazil showed that the drought of 1983 was extensive. In the interior dry region rainfall during the rainy season of 1983 was less than 40% of the normal. Analysis of the rainfall revealed that the drought of this year was the worst in the past 20 years. Rainfall anomalies over NE Brazil are related to the Southern Oscillation and sea surface temperature (SST) in the Tropical Atlantic Ocean. Variations in the Southern Oscillation index preceded the corresponding rainfall anomalies by about 2 months. Calculation of correlation coefficient between the NE Brazil rainfall and SST in the tropical Atlantic showed that March temperatures in the North Atlantic and March temperature difference between North Atlantic and South Atlantic are significantly correlated with the rainfall. However, examination of sea surface temperatures in Atlantic for the year 1983 indicated only weak relation-ship with rainfall anomalies. This suggests that for the 1983 event east-west walker circulation was also important in addition to the north-south meridional circulations forced by SST anomalies in the Atlantic. Author

N85-27477# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
TROPICAL OCEANS-GLOBAL ATMOSPHERE (TOGA) EXPERIMENT PLANNING FOR THE BRAZILIAN PARTICIPATION IN TOGA GLOBAL CLIMATE PROGRAM
Antonio Divino Moura, Carlos Afonso Nobre, Afonso daSilveiraMascarenhas, Jr., Eugenio Jose Ferreira Neiva, Fernando Pimenta Alves, Afranio Rubens deMesquita, and Yoshimine Ykeda Apr. 1985 13 p refs Presented at the TOGA Conf., Paris, 17-21 Sep. 1984
(INPE-3499-PRE/735) Avail: NTIS HC A02/MF A01

The main goal of the Tropical Oceans-Global Atmosphere Experiment (TOGA) is to study the interannual variability of the coupled ocean-atmosphere system and its impact upon global climate. TOGA is supposed to take a decade to be completed starting in January, 1985, and Brazil is among the participant nations. The preliminary Brazilian intentions and needs within the framework in TOGA are contained also included are oceanographic and atmospheric data collection and storage, oceanic and atmospheric modeling, and research priorities. Author

N85-27478# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AN APPRAISAL OF THE DURATION OF THE RECENT DROUGHT IN NORTHEAST BRAZIL AND A FORECAST FOR 1985
R. P. Kane Mar. 1985 25 p refs Sponsored by Fundo Nacional de Desenvolvimento Cientifico e Technologico
(INPE-3477-PRE/720) Avail: NTIS HC A02/MF A01

The rainfall patterns for 1981 and 1982 for 36 stations in Brazilian Northeast region were studied. In March 1981, there was widespread rainfall and hence the rainy season (March, April, May) rainfall was normal or above normal, specially at loctations of low average rainfall (arid regions). However, in the other months of 1981, rainfall was far below normal. Hence the yearly total rainfall for 1981 was below normal. For 1979, 1980, 1981, 1982 and 1983, the yearly average rainfall for the 36 stations was -10%, -15%, -17%, -18% and -44%, respectively, indicating that this whole interval of 5 years was a deficit rainfall interval, the worst year being, of course, 1983. Whether this can be considered a 5 year period of prolonged drought depends upon that below-normal level can be considered as a drought. In a recent analysis, it was shown that it was possible to predict 5 year intervals which could be drought-prone. The method is not very good for predicting rainfall for individual years. For fortaleza, the prediction for 1985 is about 1000 mm, but with an uncertainly of about + or - 600 mm. Author

N85-27479# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THERMOSPHERIC WINDS OBSERVED BY OI6300A DOPPLER SHIFTS AT 23 DEG S IN THE BRAZILIAN SECTOR
Y. Sahai, H. Takahashi, N. R. Teixeira, and B. R. Clemesha Jan. 1985 10 p ref
(INPE-3384-RPE/470) Avail: NTIS HC A02/MF A01

Thermospheric neutral wind and temperature observations measuring OI6300A Doppler shift and broadening by means of a

Fabry-Perot interferometer were started at Sao Jose dos Campos, Brazil, in February 1984. Preliminary results in the Doppler shift measurements carried on June-July 1984 show dominant zonal (eastward) winds of about 150 m/sec in the late evening, decreasing to zero around midnight. No significant meridional wind was detected during the period. Author

N85-27480# Naval Oceanography Command Detachment, Asheville, N.C.
SUMMARY OF METEOROLOGICAL OBSERVATIONS, SURFACE (SMOS), DALLAS, TEXAS Reference Report, 1973 - 1982
Aug. 1984 380 p
(AD-A150599) Avail: NTIS HC A17/MF A01 CSCL 04/2

This data report consists of a six part statistical summary of surface weather observations. The six parts are: (1) weather conditions/atmospheric phenomena; (2) precipitation/snowfall/snow depth; (3) surface winds; (4) ceiling versus visibility/sky cover; (5) psychometric summaries; and (6) station pressure/sea level pressure. GRA

N85-27481# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
AWS (AIR WEATHER SERVICE) CLIMATIC BRIEFS: ASIA Data Summary
Dec. 1984 283 p Supersedes USAFETAC/DS-81/058
(AD-A151944; AD-E850780; USAFETAC/DS-84/022; USAFETAC/DS-81/058) Avail: NTIS HC A13/MF A01 CSCL 04/2

The AWS Climatic Briefs provide summarized monthly and Annual Climatic Data for specific locations. Different data summaries provide the information for different geographical areas. These areas are: North American (including Greenland and Bermuda); Latin America (including Mexico, West Indies, and dependent islands); Europe (including North Atlantic Islands); USSR and Mongolian Peoples Republic; Africa (including Malagasy); Asia (Turkey and Cyprus to Indonesia and Japan); Antarctica; Australia; and Oceania. Meteorological elements included are: temperature, precipitation, relative humidity, vapor pressure, dew point, pressure altitude, surface wind, mean cloud cover, thunderstorm and fog days, flying weather and typhoon and hurricane data. GRA

N85-27482# Naval Postgraduate School, Monterey, Calif.
SIMULATION OF A SYNCHRONOUSLY COUPLED ATMOSPHERE-OCEAN PREDICTION MODEL M.S. Thesis
P. J. Rovero Sep. 1984 98 p
(AD-A152020) Avail: NTIS HC A05/MF A01 CSCL 04/2

The purpose of this research is to explore the need for time-dependent sea-surface temperatures in atmospheric model predictions to 10 days. Six and nine-layer versions of the Navy Operational Global Prediction System (NOGAPS) are used in this study. Control forecasts were made in which the sea-surface temperature (SST) is fixed in time. Test hindcasts were made in which the SST was updated at each time step of the atmospheric model using interpolations of 12-hourly SST analyses. The 10-day predictions are compared to determine any improvement or degradation due to the time-dependent SST. Two cases are analyzed, one during November 1983 and another during April 1984. Use of time-dependent SST's resulted in significant changes in the forecast fields of surface heat fluxes and precipitation which were physically consistent with the SST trend. Analysis of 15 storm forecasts revealed significant changes in storm track duration or cyclogenesis in only 4 cases. Three of these cases were forecast by the nine-layer version of NOGAPS during the April period and one case was forecast by the six-layer NOCAPS during the November period. GRA

N85-27483# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
AWS (AIR WEATHER SERVICE) CLIMATIC BRIEFS: NORTH AMERICA Data Summary
Sep. 1984 302 p Supersedes USAFETAC/DS-81/054
(AF Proj. 3262)
(AD-A152161; AD-E850781; USAFETAC/DS-83/043; USAFETAC/DS-81/054) Avail: NTIS HC A14/MF A01 CSCL 04/2

The AWS Climatic Briefs provide summarized monthly and Annual Climatic Data for specific locations. Different data summaries provide the information for different geographical areas. These areas are: North America (including Greenland and Bermuda); Latin America (including Mexico west Indies, and dependent islands); Europe including North Atlantic Islands); USSR and Mongolian Peoples Republic; Africa (including Malagasy) Asia (Turkey and Cyprus to Indonesia and Japan); Antarctica; Australia; and Oceania. These areas are: North American (including Greenland and Bermuda); Latin America (including Mexico, West Indies, and dependent islands); Europe (including North Atlantic Islands); USSR and Mongolian Peoples Republic; Africa (including Malagasy); Asia (Turkey and Cyprus to Indonesia and Japan); Meteorological elements included are: temperature, precipitation, relative humidity, vapor pressure, dew point, pressure altitude, surface wind, mean cloud cover, thunderstorm and fog days, flying weather and typhoon and hurricane data. GRA

N85-27484# Naval Postgraduate School, Monterey, Calif.
AN EVALUATION OF THE PERFORMANCE OF A NEW STORM TRACKING METHODOLOGY Technical Report, Oct. 1983 - Sep. 1984
T. Jayachandran Sep. 1984 50 p
(W05-13)
(AD-A152234; NPS53-84-0007) Avail: NTIS HC A03/MF A01 CSCL 04/2

This report contains the results of an exploratory statistical analysis to evaluate the performance of the Systematic Error Identification System (SEIS) and the Vortex Tracking System (VTP), when tracking weather systems. GRA

N85-27485# Sandia Labs., Albuquerque, N. Mex.
A MARKOV METHOD FOR SIMULATING NON-GAUSSIAN WIND SPEED TIME SERIES
Gerald M. McNerney (Wind America, Inc.) and Paul S. Veers Jan. 1985 12 p refs
(Contract DE-AC04-76DP-00789)
(DE85-007131; SAND-84-1227) Avail: NTIS HC A02/MF A01

A method which can be used to construct a wind simulator capable of generating wind time series with any distribution of hourly averages, exponentially decaying autocorrelation function, and a Gaussian realization of the turbulence is detailed. The method is based on a Markov random walk for hourly averages, and an inverse hourly transform of the power spectrum to produce short-term turbulence. The Markov process is discussed in the first section and the turbulence generator is covered in the second section. A description of the applications for which the model was developed follows. DOE

N85-27486# Massachusetts Univ., Amherst.
A CLIMATIC DATA BANK FOR NORTHERN HEMISPHERE LAND AREAS, 1851-1980
Raymond S. Bradley, P. M. Kelly (East Anglia Univ.), P. D. Jones (East Anglia Univ.), C. M. Goodess (East Angla Univ.), and H. F. Diaz (NOAA, Boulder, Colo.) Jan. 1985 332 p refs
(Contract DE-AC02-81EV-10739)
(DE85-007863; DOE/EV-10739/2) Avail: NTIS HC A15/MF A01

A new compilation of long-term temperature and precipitation station data is described. Over 700 temperature and 1200 precipitation records come back into the 19th century were incorporated into the data bank. Problems which contribute to potential inhomogeneities in the records are discussed (particularly changes in methods of computing mean daily temperature). The station temperature data were used in producing a gridded data set of departures from a reference period 1946 to 1960. Problems associated with changes in spatial data coverage are discussed with reference to the computation of hemispheric average temperature through time. DOE

N85-27487# California Univ., Livermore. Lawrence Livermore Lab.

INTERCOMPARISON OF RADIATION CODES IN CLIMATE MODELS (ICRCCM)

F. M. Luther and Y. Fouquart Feb. 1985 44 p refs Presented at ICRCCM Workshop, Frascati, Italy, 15 Aug. 1984
(Contract W-7405-eng-48)
(DE85-007251; UCRL-92082; CONF-8408145-1) Avail: NTIS HC A03/MF A01

The ICRCCM workshop was held in Frascati, Italy, on August 15-18, 1984. The purpose of the workshop was to review the longwave model results for a set of 37 clear-sky calculations, to plan future solar and longwave calculations for cloudy and clear conditions, and to plan general circulation model sensitivity studies. The results presented reflect the current status of the agreement between models of varying complexity. The range of variation of model results was initially greater than that shown. In some cases, models were inappropriately applied and input conditions were not properly set. Evaluation of the cause for differences between model results uncovered bugs in some models. The major discrepancies were eliminated, but it must be kept in mind that some discrepancies probably still remain. The major variation between model results is attributed to using different widths of the spectral intervals, different treatments of the H2O continuum, errors in calculating the temperature dependence of spectral lines, errors in the numerical techniques used for the integration over altitude, different sources of spectral line data, and differences in the way band parameters are derived from the spectral data. The effect of each of these factors on the model results is being investigated along with other issues important to the calculations.
DOE

N85-27488# Geological Survey, Denver, Colo.

PRELIMINARY ASSESSMENT OF CLIMATIC CHANGE DURING LATE WISCONSIN TIME, SOUTHWEST GREAT BASIN AND VICINITY, ARIZONA, CALIFORNIA AND NEVADA

W. G. Spaulding, S. W. Robinson, and L. Paillet 1984 71 p refs
(Contract DE-AI08-78ET-44802)
(DE85-008343; USGS/WRI-84-4328) Avail: NTIS HC A04/MF A01

Concentration and relative abundance of plant macrofossils illustrate compositional variations in samples from the Eleana Range-2 packrat midden. Nine macrofossil assemblages spanning 6500 radiocarbon years record local vegetational changes in the southern Great Basin of Nevada during the last one half of the late Wisconsin glacial age. The vegetation of the Eleana Range-2 site, on a south facing slope at 1810 meters altitude, was characterized by limber pine and steppe shrubs, from before 17,100 radiocarbon years before present to shortly after 13, 200 radiocarbon years before present. Changes toward a more xerophytic plant association at the site began by 16,000 radiocarbon years before present, culminating in a major change to pinyon-juniper woodland between 13,200 and 11,700 radiocarbon years before present. The climatic reconstruction for the late full glacial episode (17,000 to 15,000 radiocarbon years before present) that is proposed to account for limber pine shrub vegetation in the Eleana Range is characterized by increased winter precipitation, and very little summer rainfall. R.J.F.

N85-27489# Institut Franco-Allemand de Recherches, St. Louis (France).

FEASIBILITY STUDY ON LASER DOPPLER ANEMOMETER (LDA) WIND VELOCITY MEASUREMENTS USING PULSED VISIBLE LASER LIGHT

E. Sommer and H. J. Pfeifer 13 Jul. 1983 7 p refs Presented at 2nd Topical Meeting on Coherent Laser Radar: Technol. and Appl., Aspen, Colo., 1-4 Aug. 1983; sponsored by Optical Society of America and NOAA
(Contract BMVg-T/R-760/C-0011/C-1711)
(ISL-CO-224/83) Avail: NTIS HC A02/MF A01

In a feasibility study for laser Doppler anemometer crosswind velocity measurements, experiments were performed over distances up to 90 m using a long pulse Nd:YAG-laser in a test hall. Results show no significant decrease in the quality on the signal frequency correlograms. The number of records, however, is still too small to draw statistical conclusions. A study of the particle size distribution and concentration by an aerosol size analyzer indicates that the aerosol condition in the test hall was similar to weather conditions with > 15 km normalized visibility. This proves that measurements over at least 90 m are feasible even in unfavorable environments. Author (ESA)

N85-27490# Institut Franco-Allemand de Recherches, St. Louis (France).

AN AUTOMATIC TRAVERSING SYSTEM FOR LASER DOPPLER ANEMOMETER (LDA) APPLICATIONS TO WIND TUNNELS AND TO FREE JETS

H. J. Pfeifer, M. Koenig, and E. Sommer 13 Jul. 1983 8 p refs Presented at 10th Intern. Congr. on Instrumentation in Aerospace Simulation Facilities, St. Louis, France, 20-23 Sep. 1983 Original language document was announced in IAA as A84-25222
(ISL-CO-225/83) Avail: NTIS HC A02/MF A01

A traversing system which allows the measuring point of a laser Doppler anemometer to be moved quickly and accurately following two coordinates is described. The system is characterized by a minimum of moving parts even though the anemometer uses the forward scattering configuration. Traversing of the measuring point can be achieved manually or by a computer. In computer controlled operation, traversing can be optimized following the flow configuration under study. Author (ESA)

N85-27491# National Oceanic and Atmospheric Administration, Miami, Fla. Oceanographic and Meteorological Labs.

HURRICANE RESEARCH DIVISION, FISCAL YEAR 1984 PROGRAMS, FISCAL YEAR 1985 PROJECTIONS

Jan. 1985 58 p refs
Avail: NTIS HC A04/MF A01 CSCL 04B

The Hurricane Research Division (HRD) is NOAA's primary focus for research on hurricanes and tropical meteorology. HRD's research is directed at improved hurricane prediction through improved physical understanding of the structure and dynamics of these storms. HRD's annual hurricane field program uses the highly instrumented NOAA WP-3D research aircraft to acquire data sets that are analyzed to describe and understand the dynamics and energetics of hurricanes. HRD interacts with the National Hurricane Center in all phases of its program. HRD also interacts with the National Meteorological Center on problems of hurricane prediction and modeling, and with the National Center for Atmospheric Research on investigations of the hurricane's inner core.
GRA

N85-27492# National Oceanic and Atmospheric Administration, Princeton, N.J. Geophysics Fluid Dynamics Lab.

COMPARISON OF CIRCULATION STATISTICS BASED ON FGGE (FIRST GARP GLOBAL EXPERIMENT) LEVEL 3-B ANALYSES PRODUCED BY GFDL (GEOPHYSICS FLUID DYNAMICS LABORATORY) AND ECMWF (EUROPEAN CENTRE FOR MEDIUM RANGE WEATHER FORECASTS) FOR SPECIAL OBSERVING PERIODS

N. C. Lau Aug. 1984 240 p refs
(PB85-153948; NOAA-DR-ERL-GFDL-6) Avail: NTIS HC A11/MF A01 CSCL 04B

The Geophysical Fluid Dynamics Laboratory (GFDL) and ECMWF European Center for Medium Range Weather Forecasts (ECMWF) both designated as official data producers of Level 3-B global analyses for First GARP Global Experiment (FGGE). The data assimilation schemes used in the two centers are described in datail (1983) for the GFDL system, and for the ECMWF system. An attempt is made to assess the extent to which differences in various stages of the data handling procedures adopted by the two centers, such as those pertaining to data input, quality control, data insertion, model structure, assimilation and initialization, affect the final analyses. This assessment is performed by comparing monthly circulation statistics based on Level 3-B analyses produced by the two centers for January, February, May and June, 1979. Representative mean, variance and covariance statistics based on both the GFDL and ECMWF analyses are shown together with the corresponding difference

patterns, so as to highlight similarities and discrepancies between the two data sets. GRA

N85-27493# Electronic Techniques, Inc., Fort Collins, Colo.
SCPP (SIERRA COOPERATIVE PILOT PROJECT) FORECASTING SUPPORT Final Report, 1 Dec. 1978 - 30 Sep. 1984
J. O. Rhea, A. W. Huggins, J. L. LeCompte, A. P. Kuciauskas, and G. L. Hemmer Oct. 1984 210 p refs Sponsored by Department of Interior
Avail: NTIS HC A14/MF A01 CSCL 04B

Specific analyses were performed in support of the SCPP randomized seeding experiment in convection (SCPP-1). These are summarized and include analysis of the PETS by season, weather type and synoptic features; radar and meteorological descriptions of experimental days; detailed analysis of radar data from individual clouds; and definitions of radar response variables. Other analyses applied either to experiment in nonconvective cloud systems. GRA

N85-27494# Atmospherics, Inc., Fresno, Calif.
SCPP (SIERRA COOPERATIVE PILOT PROJECT) DATA COLLECTION AND ANALYSIS. VOLUME 1: EXECUTIVE SUMMARY Final Report, 1 Jan. 1979 - 30 Sep. 1984
Sep. 1984 42 p refs Sponsored by Department of Interior
(PB85-156065) Avail: NTIS HC A03/MF A01 CSCL 04B

All data collection and analysis tasks performed by Atmospherics Incorporated (AI) during the period 1 January 1979 through September 1984 within the Sierra Cooperative Pilot Project (SCPP) are summarized. The major categories of support by AI included the installation, operation and maintenance of, plus data collection and analysis from: (1) a network of precipitation gages, (2) ground-based instrumentation for the detection of supercooled liquid water, (3) a network of surface meteorological stations, (4) a fixed microphysics station, (5) snow and high-volume air samplers and (6) NCAR Ice Nucleus Counters. GRA

N85-27495# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.
EVALUATION OF THE PROFS (PROGRAM FOR REGIONAL OBSERVING AND FORECASTING SERVICES) 1982, REAL-TIME FORECAST EXPERIMENT Technical Report
D. A. Haugen, D. Birkenheure, R. F. Bunting, M. C. McCoy, and G. M. Williams Jun. 1984 27 p refs
(PB85-159747; NOAA-TR-ERL-427; ESG-1) Avail: NTIS HC A3/MF A01 CSCL 04B

From 1 June to 15 August 1982 the Program for Regional Observing and Forecasting Services (PROFS) conducted a forecast exercise in the Front Range area of Colorado. One purpose of the exercise was to evaluate the PROFS real-time operational workstation as an aid to improving the timeliness and accuracy of short-term forecasts. The workstation, the forecasts issued (several storm warnings, and short-term point forecasts of wind, visibility, and precipitation), and the verification program are described. Forecasts issued from an AFOS (Automation of Field Operations and Services) workstation are compared with forecasts prepared on the PROFS workstation. Author (GRA)

N85-27496# National Oceanic and Atmospheric Administration, Boulder, Colo. Air Resources Lab.
GEOPHYSICAL MONITORING FOR CLIMATIC CHANGE, NUMBER 12 Summary Report, 1983
J. M. Harris and E. C. Nickerson Dec. 1984 199 p refs
(PB85-172278) Avail: NTIS HC A09/MF A01 CSCL 04B

A special series of ozonesonde observations continued through 1983. The data acquisition system for the lidar was replaced to improve its reliability and streamline its operation. The 1983 lidar observations indicate that all measured stratospheric aerosol parameters decreased, and that no significant stratospheric aerosol injection was observed against the El Chichon background. Solar transmission as well as maximum polarization at sunrise generally increased; in addition, turbidity generally declined, reflecting the continuing cleansing of the atmosphere following the El Chichon eruption of 1982. Author (GRA)

N85-27497# National Center for Atmospheric Research, Boulder, Colo.
CIRCULATION STATISTICS FROM JANUARY AND JULY: SIMULATION WITH THE NCAR (NATIONAL CENTER FOR ATMOSPHERIC RESEARCH) COMMUNITY CLIMATE MODEL (CCMOB)
D. L. Williamson and G. S. Williamson Dec. 1984 118 p refs Sponsored by National Science Foundation
(PB85-165637; NCAR/TN-244-STR) Avail: NTIS HC A06/MF A01 CSCL 04B

Horizontal maps and meridional cross sections of selected circulation statistics are presented for 1200 day perpetual January and July simulations with the NCAR Community Climate Model (CCMOB). These circulation statistics are provided for two purposes. The first is to provide prospective model users with a brief, concise summary of the climate produced by the model. The second is to demonstrate that the climate produced by this version of the model (CCMOB) matches that produced by an earlier version (CCMOA) with a completely independent code. The original history files in the form of TBM data sets are available for additional examination and are listed herein. Author (GRA)

N85-27498# National Oceanic and Atmospheric Administration, Ann Arbor, Mich. Great Lakes Environmental Research Lab.
GREAT LAKES WINTER WEATHER AND ICE CONDITIONS FOR 1982-83
R. A. Assel, C. R. Snider, and R. Lawrence Nov. 1984 43 p refs
(PB85-165009; NOAA-TM-ERL-GLERL-55) Avail: NTIS HC A03/MF A01 CSCL 04B

Winter 1983 was one of the mildest winters in the past 200 years. One result of the unusual winter weather was the mildest overall ice season on the Great Lakes since systematic observations of ice cover extent on the Lakes were initiated some 20-odd years ago. The 1983 winter developed during the peak of one of the most intense El Nino-Southern Oscillation events of this century. An extremely strong Aleutian low that persisted most of the winter was associated with the mild temperatures in the United States. Monthly northern hemispheric circulation patterns were generally weak. GRA

N85-27499# National Environmental Satellite Service, Washington, D. C. Satellite Applications Lab.
TECHNIQUE THAT USES SATELLITE, RADAR, AND CONVENTIONAL DATA FOR ANALYZING AND SHORT-RANGE FORECASTING OF PRECIPITATION FROM EXTRATROPICAL CYCLONES
Roderick A. Scofield and LeRoy E. Spayd, Jr. Nov. 1984 58 p refs
(PB85-164994; NOAA-TM-NESDIS-8) Avail: NTIS HC A04/MF A01 CSCL 04B

A technique for estimating precipitation from extratropical cyclones using visible and infrared geostationary satellite imagery, radar data and conventional data is discussed. Extratropical cyclone systems were divided into five categories. For each category, schematics of evolution of cloud patterns associated with moderate to heavy precipitation were developed. Using the schematics along with radar and conventional data, precipitation estimates (rainfall and snowfall) and short range forecasts were produced. Verification was done on the estimates and forecasts produced from September 1982 through April 1983. GRA

N85-27500# National Weather Service, Washington, D.C. Climate Analysis Center.
MONTHLY AND SEASONAL WEATHER OUTLOOK FOR MID-JANUARY TO MID-FEBRUARY 1985, VOLUME 39, NUMBER 2, JANUARY 15, 1985
Jan. 1985 10 p
(PB85-164572) Avail: NTIS HC A02/MF A01 CSCL 04B

Weather maps which give the numerical probability estimates for seasonal temperature and precipitation in North America are given. Some data is given in tabular form. GRA

N85-27501# Wyoming Univ., Laramie. Dept. of Atmospheric Science.
CLOUD PHYSICS STUDIES IN THE SCPP (SIERRA COOPERATIVE PILOT PROJECT) Interim Report, Oct. 1983 - Sep. 1984
Sep. 1984 134 p refs
(Contract DI-2-07-81-V0256)
(PB85-163095; AS147) Avail: NTIS HC A07/MF A01 CSCL 04B

A case study of a katabatic frontal passage as observed by Sheridan Rawinsondes and the UW King Air aircraft is given. Based on this case study and a preliminary summary of other frontal passages, the shallow orographic cloud which remains on the Sierra barrier following passage of upper level hyperbaroclinic zones and katabatic fronts usually contains a substantial amount of supercooled water. The responses to seeding of clouds seeded with dry ice in the SCPP-1 seeding experiment during SCPP/84 is described. No seeding effects were observed on the day when the randomization was NO SEED and distinct seeding effects were observed on an intentional SEED day. The combined hydrometeor distributions from three PMS probes are described. In the ice multiplication region centered at -5C the combined data are superexponential distributed such that it fits a straight line on a log-log plot. GRA

N85-27502# National Oceanic and Atmospheric Administration, Rockville, Md.
MONTHLY AND SEASONAL WEATHER OUTLOOK FOR FEBRUARY 1985, VOLUME 39, NUMBER 3, JANUARY 30, 1985
Feb. 1985 10 p
(PB85-159424) Avail: NTIS HC A02/MF A01 CSCL 04B

The precipitation and temperature weather outlook for periodic and seasonal variations for North America are given. Data is presented in tabular and chart form. GRA

N85-27308# Joint Publications Research Service, Arlington, Va.
CLOUD-SEEDING FOR REGULATING PRECIPITAION IN MOSCOW AREA Abstract Only
N. Tsarapkin *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 1 Transl. into ENGLISH from Leninskoye Znamya (Moscow), 9 Dec. 1984 p 4 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

N85-27309# Joint Publications Research Service, Arlington, Va.
LIGHTWEIGHT AEROLOGICAL RADIOSONDE MARZ Abstract Only
A. Lupenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 2 Transl. into ENGLISH from Gudok (Moscow), 18 Dec. 1984 p 4 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

N85-27310# Joint Publications Research Service, Arlington, Va.
GREENHOUSE EFFECT IN EARTH'S PRIMORDIAL ATMOSPHERE Abstract Only
K. Ya. Kondratyev, N. I. Moskalenko, and S. N. Parzhin *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 4 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 277, no. 2, Jul. 1984 p 339-342 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

N85-27311# Joint Publications Research Service, Arlington, Va.
REGULARITIES IN RECENT CHANGES IN SURFACE AIR TEMPERATURE AND ATMOSPHERIC PRECIPITATION FIELDS Abstract Only
N. F. Kovyneva *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-005) 19 Apr. 1985 p 4-5 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Ser. Geogr. (Moscow), no. 6, Nov. - Dec. 1984 p 29-39 (For primary document see N85-27307 16-42)
Avail: NTIS HC A06/MF A01

N85-27344# Continental Shelf Inst., Trondheim (Norway).
ROUTINE WAVE AND METEOROLOGICAL MEASUREMENTS IN OFFSHORE AREAS USING ARGOS DATA SURVEILLANCE
S. F. Barstow, A. Lygre, and T. Audunson *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 28 p refs Sponsored by Norsk Hydro, Saga Petroleum, Statoil, British Petroleum, Philips Petroleum and IKU (For primary document see N85-27333 16-43)
(Contract NTNF-1810.7890)
Avail: NTIS HC A16/MF A01

N85-27351# Norwegian Meteorological Inst., Blindern.
AN OPERATIONAL BUOY NETWORK COLLECTING METEOROLOGICAL DATA
Carl Kolderup Jensen *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 11 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

N85-27356# Department of Transport, Pretoria (South Africa). South African Weather Bureau.
DATA FROM BOC-YACHTS: A SIGNIFICANT INPUT TO SOUTHERN HEMISPHERE ANALYSIS
P. LeRoux *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 9 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N85-27503*# National Aeronautics and Space Administration, Washington, D. C.
NASA OCEANIC PROCESSES PROGRAM ANNUAL REVIEW Annual Report, 1 Oct. 1983 - 30 Sep. 1984
Ray C. Simmons, ed. Jun. 1985 154 p refs
(NASA-TM-87565; NAS 1.15:87565; AR-5) Avail: NTIS HC A08/MF A01 CSCL 08C

Current flight projects and definition studies, descriptions of individual research activities, and a bibliography of referred journal articles appearing within the past two years are contained. Author

N85-27504# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
COMPARISON OF A DIFFUSION MODEL WITH DYE DISPERSION MEASUREMENTS TO STUDY TURBULENCE IN COASTAL WATERS
Merritt R. Stevenson and Hector M. Inostrozav Apr. 1985 26 p refs Presented at the 1st Seminar. de Modelagem Numerica do Mar., Sao Jose dos Campos, Brazil, 12-14 Dec. 1984
(INPE-3492-PRE/729) Avail: NTIS HC A03/MF A01

The operation of a coastal power plant provides the opportunity to conduct studies, which deals with circulation and horizontal mixing in coastal waters near a power plant. This study was initiated with field experiments in which small quantities of rhodamine dye solution were dispersed in the inlet and outlet bays adjacent to the power station. Sequential aerial photographs permitted the estimation of the magnitude of horizontal mixing (diffusion) coefficients. The high cost of the dye, however, makes the utilization of diffusion models an attractive supplement to such studies, since the model can be run a number of times with varied parameters. The simulated concentration fields can then be compared with the field experiments. The simple diffusion model selected for this study is based on a point discharge of a dye solution. The model assumes an isotropic field with a diffusion coefficient constant over the period of the study. To simulate the two-dimensional dye patches, an equispaced grid (441 points) was used with 5m between grid points. The time step was set for 10 minute intervals. The results of the comparison between the numerical simulation and a dye experiment are discussed. Author

N85-27505# Woods Hole Oceanographic Institution, Mass.
AN INEXPENSIVE RADAR-RESPONDING RELOCATION DEVICE FOR DRIFTING OCEANOGRAPHIC INSTRUMENTS
F. R. Hess Feb. 1985 19 p
(Contract N00014-82-C-0019; Grant NSF OCE-82-15708)
(AD-A152170; WHOI-85-6) Avail: NTIS HC A02/MF A01 CSCL 17/9

The instrument described was designed to provide sufficient data to relocate a floating object at sea. It provides a line of bearing to the object from the tracking ship. Cost and power consumption were the major driving concerns. There is a minimum of microwave circuitry. The package is reproducible for under $2,000. Our system, which requires no special, wideband receivers Answers 3-cm ship radar with a VHF signal. This signal is received on the ships VHF radiotelephone and correlated to the target bearing by the observer. A short (one-quarter second) tone is heard whenever the rotating radar search beam sweeps over the drifting buoy. The observer, while watching the PPI scope display of the ships radar, observes the bearing cursor at the moment that he hears the tone. Bearings to +/-2 to 3 degrees are readily obtainable. The most critical part of the system, as well as the most expensive (almost $300) is the X-Band antenna system. This component is used on Motorola's own radar transponders. It is an array of slot dipoles tuned to the 3 cm marine radar band. The assembly is weatherproof and used as is in the surface unit. It provides the function of antenna and tuned front end for the responder. A low-noise detector diode is mounted directly to the antenna assembly and connected by coax to the 2N5031 pre-amplifier stage. GRA

N85-27506# National Marine Fisheries Service, Woods Hole, Mass. Fisheries Center.
MARMAP SURVEY OF THE CONTINENTAL SHELF FROM CAPE HATTERAS, NORTH CAROLINA TO CAPE SABLE, NOVA SCOTIA (1977 - 1983). ATLAS 1: SUMMARY OF OPERATIONS
J. D. Sibunka and M. J. Silverman Nov. 1984 318 p refs
(PB85-150985; NOAA-TM-NMFS-F/NEC-33) Avail: NTIS HC A14/MF A01 CSCL 08A

Publications dealing with a time series of mesoscale plankton surveys and attendant information from a comprehensive fishery ecosystem study known as MARMAP are presented. Sampling methods, station activities and geographic coverage to provide a single point of reference are summarized for those interested in knowing how, when and where MARMAP surveys were conducted off northeastern United States during the 7-year period between 1977 and 1983, a period when federally-funded fishery research turned from single species studies towards holistic ecosystems studies in response to provision in the Fisheries Conservation and Management Act of 1976. GRA

N85-27291*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OCEAN TIDE MODELS FOR TOPEX ANALYSIS
Demos Christodoulidis, Ronald Estes, Douglas Chinn, and Ronald G. Williamson *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 33 p refs (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 08C

N85-27338# National Oceanic and Atmospheric Administration, Bay St. Louis, Miss.
DEVELOPMENT OF A LAGRANGIAN DRIFTING BUOY
E. G. Kerut and W. B. Wilson *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 7 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

N85-27339# Laboratoire de Meteorologie Dynamique du CNRS, Palaiseau (France).
LONG TERM DRIFTING FLOAT FOR MEASURING MEAN OCEANIC CIRCULATION USING ARGOS SYSTEM
J. C. Gascard (Laboratoire d'Oceanographie Physique), P. F. Jeannin (Laboratoire d'Oceanographie Physique), and H. Ovarlez *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 10 p (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

N85-27340# Scottish Marine Biological Association, Edinburgh (Scotland). Marine Physics Dept.
ARGOS-TRACKED DRIFTERS IN THE ROCKALL TROUGH
David J. Meldrum, D. Booth, and D. Ritchie *In* CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 14 p refs (For primary document see N85-27333 16-43)
Avail: NTIS HC A16/MF A01

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N85-27507 Central Electricity Generating Board, London (England).
DOES A 50-CYCLE ALTERNATING FIELD HAVE CENTRAL NERVOUS EFFECTS?
Gerald Fischer, H. Udermann, and Knapp 28 Mar. 1985 6 p refs Transl. into ENGLISH from Zentr. Bakteriol. Hyg. Infektionskrankh. Abt. Orig. (West Germany), v. 166, 1978 p 381-385
(BLL-CE-Trans-8083-(9022.09)) Avail: British Library Lending Div., Boston Spa, England

Rats were subjected to a 50-cycle alternating field of strength 5300/V/m for up to 21 days. At various intervals of the exposure, the norepinephrine content in the brain was measured. The changes ascertained in the turn-over of the norepinephrine metabolism agree with data in the literature on the triggering of central-nervous effects by field energies. The oxygen consumption of laboratory animals rose even after only brief exposure. At the same time, body temperature and heart rate fell below the control values. The spontaneous occurrence of these effects indicates that field energies have a point of attack in the central nervous system. To provide further data on the existence of this mechanism, the catechol amine content in the brain of exposed animals was measured. B.W.

N85-27508*# Applied Medical Technology, Inc., Brecksville, Ohio.
PERCUTANEOUS CONNECTORS Annual Report
George J. Picha and S. Ray Taylor Sep. 1981 49 p refs
(Contract NAS3-22654)
(NASA-CR-175627; NAS 1.26:175627; AR-1) Avail: NTIS HC A03/MF A01 CSCL 06B

A surface possessing a regular array of micro-pillars was evaluated with regard to its ability to control epithelial downgrowth at the percutaneous interface. A range of pillar sizes were applied to the vertical segment of T shaped Biomer (R) implants. These percutaneous tabs were implanted into the dorsum of cats for a period of 6 weeks using a standardized surgical technique. Comments were made post-operatively and at the time of retrieval. A quantitative scoring system was applied to these observations as well as histological results. As observed, the pillar morphology used displayed the ability to control epithelial downgrowth. Collagen ingrowth into the interpillar spaces and possibly direct interactions of the epithelial cells with the morphology may account for the inhibition. The reproducibility of epithelial inhibition is, however, limited by other factors which are currently not well understood. These factors and potential methods of assessment are discussed. Author

N85-27509*# Oklahoma State Univ., Stillwater. Dept. of Botany and Microbiology.
MICROBIAL ECOLOGY OF EXTREME ENVIRONMENTS: ANTARCTIC YEASTS AND GROWTH IN SUBSTRATE-LIMITED HABITATS Final Report, 1 Dec. 1979 - 31 Aug. 1984
H. S. Vishniac 1984 9 p
(Contract NAGw-26)
(NASA-CR-175810; NAS 1.26:175810) Avail: NTIS

HC A02/MF A01 CSCL 06C

An extreme environment is by definition one with a depauperate biota. While the Ross Desert is by no means homogeneous, the most exposed and arid habitats, soils in the unglaciated high valleys, do indeed contain a very sparse biota of low diversity. So sparse that the natives could easily be outnumbered by airborne exogenous microbes. Native biota must be capable of overwintering as well as growing in the high valley summer. Tourists may undergo a few divisions before contributing their enzymes and, ultimately, elements to the soil - or may die before landing. The simplest way to demonstrate the indigenicity of a particular microbe is therefore to establish unique distribution; occurrence only in the habitat in question precludes foreign origin. G.L.C.

N85-27510# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A COMMUNICATIONS LINK FOR AN IMPLANTABLE ELECTRODE ARRAY M.S. Thesis

G. S. Zeman Dec. 1984 212 p

(AD-A152238; AFIT/GE/ENG/84D-70) Avail: NTIS HC A10/MF A01 CSCL 06/2

The research conducted in this thesis develops an implantable communications (biotelemetry) link for the Air Force Institute of Technology's implantable, multiplexed, multielectrode array used to record electric potentials on the visual cortex of a mammal. A prototype is developed to test the feasibility of transcutaneous data transfer and power transfer for a system relaying 100KHz of data bandwidth. The working system uses a varactor FM modulator, phase locked loop demodulator, and op amp signal amplification. Power transfer is made by a single frequency RF inductive couple to an implanted rechargeable Ni-Cd battery pack. The implanted system draws 18 milliwatts of power and the power supply is capable of supplying 30 milliamps of current at 5 volts for a 2 hour period before recharging is required. Details of the design procedures as well as recommendations for an implantable system realization are included. GRA

N85-27511# Smith-Kettlewell Inst. of Visual Sciences, San Francisco, Calif.

THE ORIGIN OF BRAIN POTENTIALS ASSOCIATED WITH SELECTIVE VISUAL ATTENTION Annual Scientific Report, 1 Sep. 1983 - 31 Aug. 1984

K. Nakayama and M. Mackeben 30 Nov. 1984 6 p Original contains color illustrations

(Grant AF-AFOSR-0320-83)

(AD-A152291; AFOSR-85-0246TR) Avail: NTIS HC A02/MF A01 CSCL 05/10

This study is designed to find the origins of electrical signals generated by the brain in association with selective visual attention. A series of behavioral and electro-physiological tests on humans as well as on trained, alert monkeys is proposed and progress in pursuit of the stated goal is reported. GRA

N85-27512# Health Effects Research Lab., Research Triangle Park, N. C. Experimental Biology Div.

EXPERIMENTS IN MICROWAVE EXPOSURE IN THE RAT: BODY TEMPERATURE, SERUM CHEMISTRY AND THE USE OF CHEMICAL RESTRAINT Final Report, 1979 - 1980

E. Berman and H. Carter Jan. 1985 46 p refs

(PB85-156834; EPA-600/1-85-005) Avail: NTIS HC A03/MF A01 CSCL 06R

A series of experiments was conducted in rats to observe their responses to 2450-MHz(CW) microwaves. Exposures of 30 mW/cm2 caused a regular and significant increase in colonic temperature. A plateau of 38.9C was reached in 90 min and maintained for the rest of the 4-h exposure. Rats exposed to 20 mW/cm2 for 4 h exhibited patterns of colonic temperature similar to sham-exposed rats. Measurements of 26 serum chemistry values produced similar results in rats exposed to 30 mW/cm2 for 120 min and rats exposed to 0 or 20 mW/cm2 for 120 min. Only serum corticosterone was significantly increased in the dose-related response of naive rats to this acute exposure. Various injectable anesthetics were evaluated as restraints in microwave exposure experiments. Immobilization was accompanied by decreased colonic temperature. After exposure to 30 mW/cm2 for 90 min, mean colonic temperatures in chemically restrained rats ranged from 39-40.4C, and increased up to 5.5C from anesthetically to depressed pre-exposure levels. Limitations on the use of chemical restraint for this kind of experiment and on the use of multivalue serum chemistry screening tests were determined. GRA

N85-27513# National Academy of Sciences - National Research Council, Washington, D. C. Board on Agriculture.

GENETIC ENGINEERING OF PLANTS: AGRICULTURAL RESEARCH OPPORTUNITIES AND POLICY CONCERNS

1984 96 p refs

(DE85-006771; DOE/ER-13094/T1) Avail: NTIS HC A05/MF A01

The potential contribution of genetic engineering to agriculture is discussed. Research opportunities presented by the new genetic technologies, as well as their implications for funding and training in the plant sciences are discussed. DOE

N85-27129# Utah Univ., Salt Lake City. Dept. of Electrical Engineering.

THE PHYSICAL INTERACTIONS OF RADIOFREQUENCY RADIATION FIELDS AND BIOLOGICAL SYSTEMS

Carl H. Durney *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 19 p refs (For primary document see N85-27128 16-32)

Avail: NTIS HC A08/MF A01

N85-27131# Rochester Univ., N. Y. Dept. of Medicine.

THE PHYSICAL INTERACTIONS OF RADIOFREQUENCY RADIATION FIELDS AND BIOLOGICAL SYSTEMS

Norbert J. Roberts, Jr. and Sol M. Michaelson *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 26 p refs (For primary document see N85-27128 16-32)

(Contracts F33615-84-C-0608; DE-AC02-76EV-03490; Grants NIH-N01-AL-15547; NIH-N01-ES-03239)

Avail: NTIS HC A08/MF A01

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N85-27514* National Aeronautics and Space Administration, Washington, D. C.

AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 271, MAY 1985

May 1985 121 p

(NASA-SP-7011(271); NAS 1.21:7011(271)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 421 reports, articles and other documents introduced into the NASA scientific and technical information system in April 1985. Author

N85-27515 Wisconsin Univ., Madison.

EFFECTS OF POSTURE AND WATER IMMERSION ON DIAPHRAGMATIC FUNCTION Ph.D. Thesis

Akio Hashimoto 1984 270 p

Avail: Univ. Microfilms Order No. DA8428879

Upon changing posture from the upright to supine position on land or with water immersion, a significant decrease in the functional residual capacity (FRC) occurs. This is due to changes in orientation of the gravitational effect and hydrostatic pressure acting on the body. The reduced FRC is accompanied by a distortion of the chest wall, which may affect diaphragmatic function. To evaluate the effects of posture and immersion on function of the chest wall, particularly the diaphragm, at rest, during forced vital capacity (FVC) and maximal voluntary ventilation (MVV) maneuvers, and

exercise, normal males were studied under four conditions: the upright and supine posture on land and upright and prone immersed condition. The different function between the crural and the costal part of the diaphragm with posture and immersion did not affect ventilatory performance during exercise, MVV or FVC. During MVV, regardless of the condition, the diaphragm seemed to act as a fixator of the rib cage, concomitant with tonic activity of the abdominal muscles. Dissert. Abstr.

N85-27516*# National Aeronautics and Space Administration, Washington, D. C. Terrestrial Applicatins Program.
BIOENGINEERING AND REHABILITATION: WINDOWS OF OPPORTUNITY PAST, PRESENT AND FUTURE Progress Report
1985 52 p Original contains color illustrations
(NASA-EP-216; NAS 1.19:216) Avail: NTIS MF A01; SOD HC $4.50 as 033-000-00945-3 CSCL 06B

The applications of NASA research in the areas of bioengineering and rehabilitation are discussed. Wheelchairs, gait analysis, blood analyzers, programmable pacemakers and cardiology mannequins are among the topics covered. R.J.F.

N85-27517*# Federation of American Societies for Experimental Biology, Bethesda, Md. Life Sciences Div.
RESEARCH OPPORTUNITIES IN LOSS OF RED BLOOD CELL MASS IN SPACE FLIGHT
John M. Talbot and Kenneth D. Fisher Apr. 1985 55 p refs
(Contract NASw-3924)
(NASA-CR-175808; NAS 1.26:175808) Avail: NTIS HC A04/MF A01 CSCL 06S

Decreases of red blood cell mass and plasma volume have been observed consistently following manned space flights. Losses of red cell mass by United States astronauts have averaged 10 to 15% (range: 2 to 21%). Based on postflight estimates of total hemoglobin, Soviet cosmonauts engaged in space missions lasting from 1 to 7 months have exhibited somewhat greater losses. Restoration of red cell mass requires from 4 to 6 weeks following return to Earth, regardless of the duration of space flight. G.L.C.

N85-27518*# San Francisco Univ., Calif.
HISTOLOGICAL AND COMPOSITIONAL RESPONSES OF BONE TO IMMOBILIZATION AND OTHER EXPERIMENTAL CONDITIONS Semiannual Report, 1984 - 1985
R. James Brown and Werner J. Niklowitz 1985 30 p refs
(Contract NCC2-135)
(NASA-CR-175837; NAS 1.26:175837) Avail: NTIS HC A03/MF A01 CSCL 06S

Histological techniques were utilized for evaluating progressive changes in tibial compact bone in adult male monkeys during chronic studies of immobilization-associated osteopenia. The animals were restrained in a semirecumbent position which reduces normally occurring stresses in the lower extremities and results in bone mass loss. The longest immobilization studies were of seven months duration. Losses of haversian bone tended to occur predominatly in the proximal tibia and were characterized by increased activation with excessive depth of penetration of osteoclastic activity. There was no apparent regulation of the size and orientation of resorption cavities. Rapid bone loss seen during 10 weeks of immobilization appeared to be due to unrestrained osteoclastic activity without controls and regulation which are characteristic of adaptive systems. The general pattern of loss persisted throughout 7 months of immobilization. Clear cut evidence of a formation phase in haversian bone was seen only after two months of reambulation. B.W.

N85-27519# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DIAGNOSTIC SYSTEM [SISTEMA DIAGNOSTICO]
Sandra Aparecida Sandri Nov. 1984 4 p refs Presented at 2nd Simp. Fluminese de Logica, Filosof. e Teoria da Cienc., Niteroi, Brazil, 15-19 Oct. 1984 Submitted for publication
(INPE-3350-PRE/659) Avail: NTIS HC A02/MF A01

The diagnostic system developed as a link to the MYCIN and EMYCIN systems is described. The decision models used in the diagnostic system are discussed. The three modules comprising the system are the acquisition module, consultation module, and explanation module. Use of computer-based medical information systems is discussed. Transl. by B.G.

N85-27520# Duke Univ., Durham, N. C. Lab. for Environmental Research.
A COMPREHENSIVE STRATEGY FOR SATURATION DECOMPRESSION WITH NITROGEN-OXYGEN
R. D. Vann 4 Feb. 1985 46 p
(Contract N00014-84-C-0163)
(AD-A151800) Avail: NTIS HC A03/MF A01 CSCL 06/19

This paper began by discussing an empirical method for finding the ascent rates from saturation dives. These rates were estimated in a subsequent analysis. The estimates are easily modified and can be refined with additional data and other decompression models. A brief review of Doppler bubble measurements suggests several conclusions. First, the relationship between bubbles and decompression sickness is qualitatively similar for a variety of decompression exposures. Second, most decompression sickness is associated with high bubble grades. Third, Doppler bubble detectors can monitor the progressive development of bubbles during a saturation decompression, and the extent of these bubbles can be reduced by decreasing the rate of ascent. A final conclusion relates to the purpose of this workshop. Likelihood and Doppler bubble detection methods are powerful theoretical and experimental tools for solving the problems of decompression. If these tools are to be used effectively, however, adequate support for research must be available and sufficient data from experimental and operational diving must be accurately recorded and published for general use. GRA

N85-27521# Army Research Inst. of Environmental Medicine, Natick, Mass.
EVALUATION OF A FIELD EXPEDIENT TECHNIQUE FOR SWEAT SAMPLE COLLECTION
L. E. Armstrong, W. T. Matthew, P. C. Szlyk, R. W. Hubbard, and I. V. Sils Nov. 1984 54 p
(AD-A151916; USARIEM-T-2/85) Avail: NTIS HC A04/MF A01 CSCL 06/16

This series of laboratory experiments was conducted to evaluate a potential field expedient sweat collection technique (polyethylene arm bags) and to observe the Sweat rate and electrolyte losses of human sweat glands during thermal stimulation. The development of the methodology in this report has resulted in a technique that offers: (1) a clean skin surface prior to sweat sample collection; (2) a known skin surface area inside the arm bag, (3) quantitative recovery (97.3%) of sweat electrolytes, and (4) sweat electrolyte concentrations which agree well with values reported by other laboratories. Polyethylene arm bags were found to induce changes in the local forearm microenvironment (when compared to OPEN arms); increases in skin temperature, relative humidity, sodium excretion, and potassium excretion were observed. In spite of these changes in local microenvironment, this technique is useful as a relative measure by day-to-day (or hour-to-hour) changes in sweat collection techniques, such as large sample size, ease of use and field portability. Measurements such as sweat electrolyte losses during exercise in the heat, or sweat rates during heat acclimatization, are feasible with this technique. GRA

N85-27522# Defence Research Establishment, Ottawa. (Ontario).
INVESTIGATION OF THE REQUIREMENT FOR AUXILIARY HEATING OF CANADIAN FORCES PERSONNEL
S. D. Livingstone, R. W. Nolan, and S. W. Cattroll Aug. 1984 26 p
(AD-A151950; DREO-TN-84-17) Avail: NTIS HC A03/MF A01 CSCL 06/17

In order to investigate the requirement for auxiliary heating by the Canadian Forces, a questionnaire was administered to approximately 1500 CF personnel with experience working outdoors in cold weather. In addition to analyzing the respondents' actual

replies, the authors also interpreted the completed questionnaires regarding the need for auxiliary heat. It was concluded that auxiliary heating would be beneficial to more than 50% of personnel with problems associated with working in the cold and that most of these problems were due to cold extremities (hands and feet). In the past, various auxiliary heating devices (handwarmers, electrically-heated gloves and socks, etc.) have been assessed for potential application in military operations in cold weather. Many of these assessments have been ad hoc trials of items off-the-shelf which, because of the design, physiological factors, or special military requirements involved, were poorly suited to the needs of the military. Certain delegates at NATO R&D conferences have shown a continuing interest in the potential of auxiliary heating, and a continuing concern that a systems approach be employed to provide better equipment and a better understanding of the applications and limitations of auxiliary heating. GRA

N85-27523# Army Research Inst. of Environmental Medicine, Natick, Mass.

COMPARATIVE ANAEROBIC POWER OF MALES AND FEMALES

M. M. Murphy, J. F. Patton, and F. A. Frederick Mar. 1985 19 p
(AD-A151960; USARIEM-M21/85) Avail: NTIS HC A02/MF A01 CSCL 06/14

The purpose of this study was to determine the differences in anaerobic power between males and females and the contribution of anthropometric variables in accounting for these differences. Eighteen female and nineteen male subjects performed the Wingate test as a measure of anaerobic power (AnP). Each subject pedalled maximally for 30s against a resistance of 4.41 joules/pedal revolution/kg body weight on a modified Monark ergometer which allowed instantaneous application of resistance. Revolutions were determined by a computer interfaced frequency counter. Thigh volume (TV) by water displacement, lean body mass (LBM) from skinfolds and body weight (BW) were used as anthropometric variables. Absolute AnP of males was significantly higher than females, as were pedal revolutions. The difference between genders decreased when power was expressed in terms of TV, BW and LBM, in that order. These data reveal that a larger portion of the between gender variation compared to the within gender variation in AnP can be accounted for by the anthropometric variables. However, a significant portion remains that must be explained by the individual muscles' potential for glycolytic energy production. GRA

N85-27524# New Hampshire Univ., Durham. Vision Research Lab.

SPATIAL AND TEMPORAL VISUAL MASKING AND VISIBILITY Final Report, 1 Oct. 1979 - 29 Sep. 1984

R. A. Smith 1 Oct. 1984 39 p
(Grant AF-AFOSR-0045-80)
(AD-A151968; AFOSR-85-0245TR) Avail: NTIS HC A03/MF A01 CSCL 06/16

Two major studies have been completed this year, and several others are in progress. In visual masking, we have studied the effect of different detection criteria and find that criterion has a more profound effect than is usually believed. Not only does criterion change alter overall sensitivity, but the qualitative nature may yield either Weber's Law behavior or power-law behavior, depending on criterion. We conclude that much of the literature on spatial frequency masking is essentially unrepliciable, since criterion was uncontrolled, and we offer possibility of using motion to enhance the visibility of displayed images, we have been studying hypothetical detectors for moving objects. We began this study with the simpliest possible stimulus, a pair of briefly-flashed lines, separated in space and time (a variant of the apparent motion paradigm). Although lateral interactions between line segments have generally been reported to be inhibitory, with this paradigm, we find a range of excitatory interactions which suggest a motion detector with a tuned velocity of about 3 deg/sec. Additional keywords: Vision, Visibility, Charts. GRA

N85-27525# Army Research Inst. of Environmental Medicine, Natick, Mass.

EFFECTS OF DEHYDRATION OR COLD EXPOSURE AND RESTRICTED FLUID INTAKE UPON COGNITIVE PERFORMANCE

L. E. Banderet, D. M. MacDougall, D. E. Roberts, D. Tappan, and M. Jacey 22 Oct. 1984 15 p
(AD-A151973; USARIEM-M38/84) Avail: NTIS HC A02/MF A01 CSCL 05/10

The present study examined the effects of initial hydration state upon cognitive performance during the cold exposure. Five tests (Coding, Number Comparison, Computer Interaction, Pattern Comparison, and Grammatical Reasoning) were used to assess the cognitive performance of 36 male Marine volunteers. All subjects practiced the tests extensively the 3 days before the cols exposure. Two groups of 18 subjects each were studied, 21 days apart, for 10 consecutive days. The second group of subjects was dehydrated by 2.5% of their body weight by severe fluid restriction and exercise-induced sweating the day before the cold exposure; the first group was normally-hydrated. All subjects spent 5 days in an environmental chamber where temperatures during the day were -23 to -25 C with 4 km/h winds and night conditions ranged from -4 to -10 C without wind. In the cold the subjects wore protective Artic Uniforms; afterwards, recovery was evaluated for 27 hours. All cognitive assessment was interspersed with extensive physical work. The results indicate that dehydration or cold temperature with limited intake of fluids impairs cognitive performance. GRA

N85-27526# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A MULTIPOLE MODEL OF THE OBSERVED CEREBRAL CORTEX MAGNETIC FIELD M.S. Thesis

P. J. DeRego Dec. 1984 162 p
(AD-A152237; AFIT/GE/ENG/84D-23) Avail: NTIS HC A08/MF A01 CSCL 06/16

A Multipole model of magnetic field sources in the cerebral cortex was developed as an expansion of Grynszpan's single dipole in a conducting sphere model. Both computer simulation and actual conducting sphere experiments were used to generate field plots in five separate dipole configurations. These include one case of a single dipole, three cases of three dipoles on a single radial, and one case of two dipoles on independent radials. The results show that dipoles oriented on a single radial do not produce multiple flux peaks, but rather a twisted version of the single dipole field. Sufficiently distant dipoles on independent radials, however, do produce multiple peaks. The largest field distortions occurred when nonconducting masses were in close proximity to the active dipoles. GRA

N85-27527# Health Effects Research Lab., Research Triangle Park, N. C.

BIOLOGICAL INFLUENCES OF LOW-FREQUENCY SINUSOIDAL ELECTROMAGNETIC SIGNALS ALONE AND SUPERIMPOSED ON RF CARRIER WAVES

C. F. Blackman Jan. 1985 19 p refs
(PB85-161248; EPA-600/D-85-010) Avail: NTIS HC A02/MMF A01 CSCL 06R

The experiments that were performed to examine the biological responses caused by exposure to low frequency electromagnetic radiation directly or as modulation of RF carrier waves are described in a historical context. The independently-replicated fundamental finding, the field enhanced efflux of calcium ions from brain tissue in vitro, as well as reports of CNS-related changes caused in synaptosome preparations, neuroblastoma cell cultures and intact whole animals are reviewed. Non-CNS tissue has shown positive results caused by exposure to these electromagnetic fields including work with pancreatic tissue slices and lymphocytes. Recent results demonstrating the influence of the Earth's magnetic field are also discussed, along with their implications for the design of future experiments. Lastly, the mechanism of action is conceptualized, and recommendations are made to assist in attempts to correlate the results obtained with diverse biological systems.GRA

N85-27130# Washington Univ., Seattle. Bioelectromagnetics Research Lab.
THERMAL CONSEQUENCES OF LOCALIZED SAR FROM RFR EXPOSURES
A. W. Guy *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 18 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

N85-27132# School of Aerospace Medicine, Brooks AFB, Tex.
THE CUMULATIVE EFFECTS OF LONG TERM EXPOSURE TO LOW LEVELS OF RADIOFREQUENCY RADIATION (RFR)
Jerome H. Krupp *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 14 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

N85-27133# Air Force Occupational and Environmental Health Lab., Brooks AFB, Tex.
THE MEDICAL RESULTS OF HUMAN EXPOSURES TO RADIO FREQUENCY RADIATION
R. B. Graham *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 8 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

N85-27134# Rochester Univ., N. Y. Dept. of Medicine.
REVIEW OF EPIDEMIOLOGICAL STUDIES OF HUMAN EXPOSURES TO RADIOFREQUENCY RADIATION
Norbert J. Roberts, Jr. and Sol M. Michaelson *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 6 p refs (For primary document see N85-27128 16-32)
(Contracts F33615-84-C-0608; DE-AC02-76EV-03490; Grants NIH-N01-AL-15547; NIH-N01-ES-03239)
Avail: NTIS HC A08/MF A01

N85-27135# Bundesgesundheitsamt, Neuherberg (West Germany). Inst. for Radiation Hygiene.
EVALUATION OF HUMAN EXPOSURES TO LOW FREQUENCY FIELDS
Juergen H. Bernhardt *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 18 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

N85-27136# Washington Univ., Seattle. Center for Bioengineering.
HAZARDS OF VLF ELECTROMAGNETIC FIELDS
Arthur W. Guy *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 20 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

N85-27137# School of Aerospace Medicine, Brooks AFB, Tex.
DEVELOPMENT AND APPLICATION OF NEW RADIOFREQUENCY RADIATION SAFETY STANDARDS
John C. Mitchell *In* AGARD The Impact of Proposed Radio Frequency Radiation Standards on Mil. Operations Mar. 1985 13 p refs (For primary document see N85-27128 16-32)
Avail: NTIS HC A08/MF A01

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N85-27528*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE INTRODUCTION OF NEW COCKPIT TECHNOLOGY: A HUMAN FACTORS STUDY
Renwick E. Curry May 1985 71 p refs
(NASA-TM-86659; Rept-86659; NAS 1.15:86659) Avail: NTIS HC A04/MF A01 CSCL 05H

A joint Airline/NASA field study of B-767 training and operations was conducted during the period this aircraft was being introduced into line service. The objectives of the study were: (1) to identify any adverse reactions to the new technology; (2) to provide a clearing house of information for the airlines and pilots during the introductory period; (3) to provide feedback on airline training programs for the new aircraft; and (4) to provide field data to NASA and other researchers to help them develop principles of human interaction with automated systems. It is concluded that: (1) a large majority of pilots enjoy flying the B-767 more than the older aircraft; (2) pilots accept new cockpit technology and find it useful; (3) pilots are aware of the potential loss of flying skills because of automation, and take steps to prevent this from happening; (4) autopilot/autothrottle interactions and FMS operations were sometimes confusing or surprising to pilots, and they desired more training in this area; and (5) highly automated cockpits can result in a loss of effective monitoring performance. B.W.

N85-27529# Naval Health Research Center, San Diego, Calif.
PREDICTORS OF COLD WEATHER HEALTH BEHAVIORS Interim Report
R. R. Vickers, Jr. and L. K. Hervig Oct. 1984 26 p
(AD-A151910; NAVHLTHRSCHC-84-46) Avail: NTIS HC A03/MF A01 CSCL 05/10

This study screened potential predictors of maladaptive cold weather behaviors. Male Marine Corps volunteers (n = 161) completed questionnaires providing a battery of predictor measures, including: (1) Personal history variables related to cold injuries, (2) Health beliefs concerning personal susceptibility to and severity of illness, and the efficacy of preventive behaviors, and perceived control of health outcomes by personal actions, professionals skills, and chance, (3) Health habits, and (4) Situational variables including mood, perceived leadership, weather conditions, workload, and morale. Self-reported liquid intake, food intake, and foot care during field exercises in cold weather training were the dependent variables. The combined predictors explained 22.1% of the variance in food intake, 15.1% of the variance in foot care, but only 2.3% of the variance in liquid consumption. The initial findings suggest that refined models can be developed with further work which will have higher predictive accuracy and provide a basis for developing programs to improve cold weather health behaviors. GRA

N85-27530# Air Force Human Resources Lab., Brooks AFB, Tex.
TRENDS SHAPING ADVANCED AIRCREW TRAINING CAPABILITIES THROUGH THE 1990S Final Report, Jul. 1983 - Jul. 1984
R. G. Hughes and L. Brown Mar. 1985 20 p
(AF Proj. 1123)
(AD-A152277; AFHRL-TP-84-52) Avail: NTIS HC A02/MF A01 CSCL 05/9

Simulation will become a major training system resource for the support of tactical aircrew training in the 1990s. Technologies in this area will be driven by the desire to extend the traditional notion of a simulator to that of a multi-cockpit multi-sensor device capability by the late 1980s. The ultimate user goal will be to arrive at those configurations of this new technology which prove to be cost effective for fielding the base (wing and/or squadron) level. Critical technologies for making such unit-level basing possible lie chiefly in the area of visual system display. In particular, unit-level basing of an advanced simulation capability will depend in large part on the success of headand eye-coupled display technology and the anticipated reductions in overall system costs associated with adoption of such an approach. Near-term training device research and development (R/D) goals call for the functional integration of a multiple-cockpit, multi-sensor device capability (using head and eye coupling either in a helmet display or dome configuration) with a state-of-the-art, instrumented range facility by the early to mid-1990s. This centralized, center concept represents a significant R/D goal as well as an operational

milestone with respect to planning for future aircrew training systems. GRA

N85-27531# Airbus Industrie, Blagnac (France). Dept. des Operations
STATISTICAL STUDY OF THE DYNAMIC ANALYSIS OF THE WORKLOAD IN THE A310 CERTIFICATION CAMPAIGN [ETUDE STATISTIQUE DES COTATIONS DE CHARGES DE TRAVAIL DE L'ANALYSE DYNAMIQUE DE LA CAMPAGNE DE CERTIFICATION DE L'A310]
12 Apr. 1984 209 p In FRENCH
(Contract DRET-83-1145)
Avail: NTIS HC A10/MF A01

Airbus A310 crew workload assessment is described. At any moment of the flight the workload is subjectively estimated by the onboard personnel or by a qualified observer. The evaluating team is composed of two pilots, an observer and a flight director. A quantitative scale was adopted. Thousands of evaluations were analyzed, validating the method of analysis. The results show that the workload is equal to or less than the workload observed in the A 300 FF aircraft tests. Author (ESA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N85-27532*# SRI International Corp., Menlo Park, Calif. NASA Technology Applications Team.
PRELIMINARY TECHNOLOGY UTILIZATION ASSESSMENT OF THE ROBOTIC FRUIT HARVESTER
James Wilhelm Oct. 1982 18 p refs
(NASA-CR-175834; NAS 1.26:175834) Avail: NTIS HC A02/MF A01 CSCL 05H

The results of an analysis whose purpose was to examine the history and progress of mechanical fruit harvesting, to determine the significance of a robotic fruit tree harvester and to assess the available market for such a product are summarized. Background information that can be used in determining the benefit of a proof of principle demonstration is provided. Such a demonstration could be a major step toward the transfer of this NASA technology. G.L.C.

N85-27533# Naval Postgraduate School, Monterey, Calif.
SHAPE WITH AND WITHOUT REDUNDANT COLOUR AS CODING MECHANISM FOR SIMULATED RADAR DISPLAYS IN A TIME-EXTENDED SIMPLE VIGILANCE TASK M.S. Thesis
U. Hessling Sep. 1984 63 p
(AD-A151683; AD-E751179) Avail: NTIS HC A04/MF A01 CSCL 05/8

In this thesis a simple monitoring task was extended to eight hours to achieve a higher realism in testing human vigilance. An extremely low stimulus frequency, the confinement of the subjects during the test run, and the scheduling experiment from 10:00PM to 6:00AM were further tools to create a more operational environment. Subjects were treated in one of two conditions, simulating a shipborne tactical radar display with precoded information, to test a currently operational shape coding mechanism (control condition) for positive effects due to the addition of redundant color codes (experimental condition). The results did not support the hypothesis of positive effects in the experimental condition. In fact, the number of ommissions was significantly higher in that condition. Longer reaction times in both conditions were found to be correlated to higher signal and display densities. GRA

N85-27534# Army Construction Engineering Research Lab., Champaign, Ill.
DESIGN OF COMPUTER-RELATED WORKSTATIONS IN RELATION TO JOB FUNCTIONS AND PRODUCTIVITY Final Report
C. C. Lozar and R. D. Neathammer Dec. 1984 100 p
(Contract MIPR-80-939-5)
(AD-A151938; CERL-P-85/09) Avail: NTIS HC A05/MF A01 CSCL 05/5

This research analyzed offices at the Defense Systems Automation Center, Defense Logistics Agency, Columbus, OH, to determine workstation design criteria for computer-related job functions. This was done by determining the functional needs of employees and by a before and after renovation evaluation of a prototypical workstation area. The prototype was compared and evaluated to control groups. Certain hypotheses about spatial adequacy, privacy, and productivity were tested within the limits fo the control group and the overall survey. The results of this analysis were related to previous research and then transplanted into recommended design actions which can be interpreted by interior designers, architects, and office managers. This will improve performance in computer-related job functions through layout, furnishings selection, and support services within the physical envelope and the management structure of the organization. GRA

N85-26658# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).
A DESCRIPTION OF THE PROCESS OF ELABORATING MAN-MACHINE DIALOG IN AN AIRCRAFT EQUIPPED WITH CATHODE TUBES: ROLES AND SPECIFICATIONS OF PILOTED SIMULATION METHODS [DESCRIPTION DU PROCESSUS DELABORATION DU DIALOGUE HOMME MACHINE DANS LES AVIONS DARMES EQUIPES DE TUBES CATHODIQUES ROLE ET DESCRIPTION MOYENS SIMULATION PILOTEE]
Pierre Helie *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 12 p refs In FRENCH (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering.*

N85-27535 Technische Univ., Munich (West Germany). Inst. fuer Mathematik.
GENERALIZED GRAPH COLORING: A FREQUENCY ASSIGNMENT METHOD FOR VHF BROADCASTING
Ralf Kleinsteuber Nov. 1984 32 p refs
(TUM-M8405) Copyright. Avail: Issuing Activity

A computerized method for VHF frequency assignment in nonidealized networks was developed. It considers all the relevant parameters, including varying distances, transmitter power, antenna height, and antenna radiation patterns. The program

needs < 5 hr on an HP-1000 computer with floating point processor to find a solution for 99 transmitters. Author (ESA)

N85-27536# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
IMPLEMENTATION AND ANALYSIS OF A MICROCOMPUTER BASED RELATIONAL DATABASE SYSTEM M.S. Thesis
T. G. Kearns Dec. 1984 134 p
(AD-A151770; AFIT/GCS/ENG/84D-12) Avail: NTIS HC A07/MF A01 CSCL 09/2

The single processor optimized relational database system is a database system designed and implemented for teaching and research purposes at the Air Force Institute of Technology. To complete the implementation of the relational database system an investigation of the design and implementation of the previous research efforts was done. Additional research was done to explore possible designs and implementations of access structures and possible methods to implement the relational operators. With this background, a structured design was completed for the access structure and the relational operators. Once this was accomplished, the low level access structure was implemented and tested, providing the capability to insert, delete and modify data in the relational database system. Finally, some of the relational operators were implemented and tested providing an operational relational database system. GRA

N85-27537# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DEVELOPMENT OF COMPUTER AIDED DATABASE DESIGN AND MAINTENANCE TOOLS M.S. Thesis
E. R. Jankus Dec. 1984 142 p
(AD-A151782; AFIT/GCS/EE/84D-10) Avail: NTIS HC A07/MF A01 CSCL 09/2

This thesis investigated that the tasks of the database administrator are and detailed a list of computer aided tools to assist the DBA in performing those tasks. A selection criteria was established and two of the tools were implemented. The first tool implemented was an interactive user-friendly Automated System for Normalizing Relations into Third Normal Form. The basis for this tool is the concept of a minimal cover as presented by Jeffrey Ullman. If a minimal cover is deduced from the set of functional dependencies of an unnormalized relation, the resultant relations are in Third Normal Form. The second tool explores the user friendly graphics area. It is a new front-end to the normalization tool that uses a mouse to allow the DBA to specify the functional dependencies that go into the normalization process. Together, these tools provide a very useful and complete system for the DBA to normalize relations in a Relational Database. Author (GRA)

N85-27538# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE SYSTEMATIC INTEGRATION OF VERY LARGE SCALE INTEGRATED CIRCUIT COMPUTER-AIDED DESIGN TOOLS INTO A TOOLKIT OPTIMIZED FOR ACADEMIC APPLICATIONS M.S. Thesis
T. R. Vermillion Dec. 1984 261 p
(AD-A151813; AD-F300584; AFIT/GE/ENG/84D-68) Avail: NTIS HC A12/MF A01 CSCL 09/2

The lack of an integrated, compatible set of VLSI CAD tools has been suggested as a serious problem which prohibits the optimization of the academic curricula necessary to produce the required VLSI design engineers. This thesis proposes that the CAD tool problem may be solved through the development of a VLSI CAD toolkit. The characteristics of an integrated, technically complete, academically-oriented VLSI CAD toolkit have been presented. A systematic method to integrate CAD tools was developed and supported through the design of a set of CAD tool evaluation metrics. The characterization of the integrated toolkit, though not complete, appears to constitute a solid basis for future work. The evaluation metrics and methodology were simple to implement and provided absolute and relative measurements of the level of presence of desired characteristics in toolkit components. GRA

N85-27539# Harvard Univ., Cambridge, Mass. Computation Lab.
PARALLEL TIME 0(LOG N) ACCEPTANCE OF DETERMINISTIC CFLS
J. H. Reif and P. N. Klein Mar. 1984 36 p
(Contract N00014-80-C-0647; Grant NSF MCS-82-00269)
(AD-A152255; TR-05-84) Avail: NTIS HC A03/MF A01 CSCL 09/2

This document gives a parallel random access memory algorithm for simulating a deterministic pushdown automaton. On an input of length n,a DPDA will use time O(n); this simulation requires time O(log n) and only polynomially many processors. The algorithm can be easily adapted to accept the 1.R(k) languages as well. GRA

N85-27540# Oak Ridge National Lab., Tenn. Product Certification Div.
A PROCEDURE FOR COMMUNICATIONS WITH PDP-10 AND PDP-11 (IS/1 UNIX) TYPE COMPUTERS THROUGH USE OF CPT WORD PROCESSING EQUIPMENT, REVISION 1
C. A. Reeves, Jr. 1 Jan. 1985 61 p
(Contract DE-AC05-84OS-21400)
(DE85-007596; Y/DL-759-Rev-1) Avail: NTIS HC A04/MF A01

A detail procedure is given for communications between CPT work processing equipment and PDP type computers including the PDP-10, PDP-11, and VAX series computers. This procedure is presented both to assist and to give guidelines for such communications, and to aid persons with similar types of equipment, perhaps of other manufacturers, in their endeavors. DOE

N85-27541# Environmental Protection Agency, Cincinnati, Ohio. Water Engineering Research Lab.
FORWARD LIBRARY SEARCHING OF PREVIOUSLY-QUANTITATED PEAKS, USING A SCAN LIST CREATED FROM A QUANTITATION LIST BY A NOVEL FORTRAN PROGRAM FOR THE INCOS DATA SYSTEM
B. M. Austern Feb. 1985 8 p
(PB85-165835; EPA-600/M-85-007) Avail: NTIS HC A02/MF A01 CSCL 09B

A method to use an INCOS data system to perform forward library searches is discussed. A FORTRAN program was designed which creates a scan list from a quantitation list to help perform the task. GRA

N85-28625# Hitachi Ltd., Tokyo (Japan).
RECENT ADVANCES IN SUPERCOMPUTERS
Toshihko Odaka *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 123-130 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N85-27542*# Brigham Young Univ., Provo, Utah. Dept. of Civil Engineering.
A GENERAL PURPOSE SCATTER STORAGE SUBSYSTEM AND A COMPARISON OF HASHING METHODS M.S. Thesis
Steven C. Macy Dec. 1984 144 p refs
(Grant NAG1-391)
(NASA-CR-175814; NAS 1.26:175814) Avail: NTIS HC A07/MF A01 CSCL 09B

Scatter storage techniques, sometimes referred to as hashing techniques, were developed to provide a means whereby external labels, or keys, may be mapped to some unique internal number,

the latter generally being used as a storage location where information related to the key may be stored. The use of scatter storage techniques are required whenever the possible number of unique keys exceeds the number of available storage locations. Scatter storage techniques were originally developed for computer language compilers as a means of mapping program variable names to the computers internal storage locations. Due to the large number of possible variable names allowed by most compilers, it would be impractical to require any computer to provide a unique storage location for every possible variable name. A general purpose hashing subsystem designed to be easily implemented into existing application programs is presented. Also presented are various popular hashing algorithms as well as empirical test data characterizing the performance of each algorithm. Author

N85-27543*# Texas Univ., Arlington.
RELIABILITY MODELS FOR DATAFLOW COMPUTER SYSTEMS Final Report
Krishna M. Kavi and Bill P. Buckles Mar. 1985 133 p refs (Grant NAG2-273)
(NASA-CR-175813; NAS 1.26:175813) Avail: NTIS HC A07/MF A01 CSCL 09B

The demands for concurrent operation within a computer system and the representation of parallelism in programming languages have yielded a new form of program representation known as data flow ([DENN 74], [DENN 75], [TREL 82a]). A new model based on data flow principles for parallel computations and parallel computer systems is presented. Necessary conditions for liveness and deadlock freeness in data flow graphs are derived. The data flow graph is used as a model to represent asynchronous concurrent computer architectures including data flow computers. B.W.

N85-27544# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
USE OF REDUCE 2 FOR SYMBOLIC PROGRAMMING [UTILIZACAO DO REDUCE 2 PARA PROGRAMACAO SIMBOLICA]
Guilherme Bittencourt and Luiz Alberto Vieira Dias Dec. 1984 20 p refs In PORTUGUESE Presented at 5th Seminario ADUNESP/Guaratingueta, Guaratingueta, Spain, 22-27 Oct. 1984 Submitted for publication
(INPE-3355-PRE/633) Avail: NTIS HC A02/MF A01

A brief history of symbolic computer manipulation is presented, including the linguistic principles of REDUCE 2 and the better known symbolic manipulation systems. REDUCE 2 is described as a general symbolic manipulation system. The applications of REDUCE 2 developed at the Institute of Space Research for the solution of differential equations and series manipulation are discussed. The symbolic manipulation capacity of REDUCE 2 is evaluated. Transl. by B.G.

N85-27545# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
COMPARATIVE STUDY OF THE DIGITAL ANALYSIS OF AREAS OF THE EARTH'S SURFACE PREPARED FOR PLANTING USING DIFFERENT CLASSIFICATION ALGORITHMS [ESTUDO COMPARATIVO DA ANALISE DIGITAL DE AREAS DE SOLO PREPARADO PARA PLANTIO UTILIZANDO DIFERENTES ALGORITMOS DE CLASSIFICACAO]
Mauricio Alves Moreira, Getulio Vargas deAssuncao, Antonio Roberto Formaggio, and Thelma Krug deMorais Nov. 1984 13 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Reuniao Anual da SELPER, Santiago, Chile, 12-17 Nov. 1984 Submitted for publication
(INPE-3359-PRE/637) Avail: NTIS HC A02/MF A01

The single-cell, Maxver, and K-median classifications in soil areas prepared for planting were studied and the use of the UNITOT method with the results of automatic classification was verified. The methodology consisted of a statistical study of classification analysis applied to alphanumeric maps. The classifications studies all are part of the Interactive Multispectral Image Analysis System (Image-100). E.A.K.

N85-27546# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
FURTHER DEVELOPMENT OF AN INTERACTIVE CONTROL ENGINEERING COMPUTER ANALYSIS PACKAGE (ICECAP) FOR DISCRETE AND CONTINUOUS SYSTEMS M.S. Thesis
A. T. Armold Dec. 1984 271 p
(AD-A151783; AFIT/GE/EE/84D-14) Avail: NTIS HC A12/MF A01 CSCL 09/2

This thesis reports on the on-going effort to design and implement an Interactive Control Engineering Computer Analysis Package (ICECAP). When fully implemented ICECAP will enable a Control Engineer to analyze and design continuous and discrete time problems. This project started with Captain Glen T. Logan's implementation of the program called TOTAL which is the core of ICECAP. Captain Charles J. Gembarowski continued Logan's effort and began implementation of the User friendly command structure. Captain Robert E. Wilson implemented the help/teach modules and completed the continuous time functions started by Gembarowski. The main emphasis of this thesis investigation was the implementation of the discrete command structure so that discrete analysis and design could be performed by ICECAP. Furthermore, other commands were implemented to improve ICECAP's continuous and discrete time function capabilities. GRA

N85-27547# Army Industrial Base Engineering Activity, Rock Island, Ill.
MANUFACTURING METHODS AND TECHNOLOGY CAD/CAM (COMPUTER-AIDED DESIGN/COMPUTER-AIDED MANUFACTURING) RELATED EFFORTS (FY 1980 - 1986) Annual Report
D. L. Richardson Dec. 1984 132 p
(AD-A151817; AD-E700015) Avail: NTIS HC A07/MF A01 CSCL 13/8

This report provides a summary of the Army's Manufacturing Methods and Technology (MMT) Program directed toward computer-aided design (CAD)/computer-aided manufacturing (CAM). The report describes individual work efforts covering the period FY 80 through FY 86 and gives necessary information to determine the direction, application and status of each effort. These efforts were selected from the MMT program as being CAD/CAM activities by the Chairman of the Manufacturing Technology Advisory Group CAD/CAM Subcommittee. Also, a specific system technology area was selected for each effort. In this report, the efforts are organized. GRA

N85-27548# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INTERACTIVE COMPUTER PACKAGE FOR USE WITH SIMULATION MODELS WHICH PERFORMS MULTIDIMENSIONAL SENSITIVITY ANALYSIS BY EMPLOYING THE TECHNIQUES OF RESPONSE SURFACE METHODOLOGY M.S. Thesis
K. J. Sparrow Dec. 1984 430 p
(AD-A151956; AFIT/GOR/OS/84D-12) Avail: NTIS HC A19/MF A01 CSCL 09/2

The overall objective of this research effort was to develop an interactive, user-friendly response surface methodology computer package which can be attached to any FORTRAN based simulation model to yield a response function which describes the relationships between the input parameters and the output parameter of interest. Subobjectives were: (1) After the response surface is generated, search this surface for the combinations of pertinent input parameters that yield the optimum response, (2) Interpret how the response function reveals the sensitivity of the output parameter due to changes in input parameters, and (3) Illustrate how the response function describes the relative ranking of effects on response between input parameters. This research effort accomplished the overall objective and touched on subobjectives two and three. The overall objective was accomplished by developing the RSM computer program. The user-friendly requirement meant the program had to be flexible and easy to understand. The input requirements were designed to be easily understood and proceed in a logical sequence. Five

design types are offered by this program and also a user design input subroutine offers further flexibility. GRA

N85-27549# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
CHARACTER RECOGNITION USING CORRELATION TECHNIQUES M.S. Thesis
L. Shum Dec. 1984 150 p
(AD-A152006; AFIT/GE/ENG/84D-59) Avail: NTIS HC A07/MF A01 CSCL 05/7

This thesis presents an algorithm for recognition of letters of the English alphabet. The letters may be single, isolated letters; or concatenated, groups of letters. The algorithm essentially consists of a two pass correlation in which the size and energy of the unknown characters are set equal to a known template. GRA

N85-27550# Naval Postgraduate School, Monterey, Calif.
MANAGEMENT ASPECTS OF SOFTWARE MAINTENANCE M.S. Thesis
B. J. Henderson and B. J. Sullivan Sep. 1984 116 p
(AD-A152035) Avail: NTIS HC A06/MF A01 CSCL 09/2

The Federal government depends upon software systems to fulfill its mission. These software systems must be maintained and improved to continue to meet the growing demands placed on them. The process of software maintenance and improvement may be called software evolution. The software manager must be educated in the complex nature of software maintenance to be able to properly evaluate and manage the software maintenance effort. In this thesis, the authors explore software maintenance from a management perspective, highlighting topics of critical importance. These topics include forecasting software maintenance, estimating the resources required to perform software maintenance, managing maintenance personnel and effectively utilizing software tools. The synthesis of these topics forms a managerial paradigm for understanding the evolutionary nature of software maintenance. GRA

N85-27551# Naval Postgraduate School, Monterey, Calif.
A FRAMEWORK FOR SOFTWARE DEVELOPMENT M.S. Thesis
E. C. Hughlett Sep. 1984 102 p
(AD-A152067) Avail: NTIS HC A06/MF A01 CSCL 09/2

All sectors of society are confronted with what has been termed the software crisis. As the world's largest single buyer of software, the Department of Defense has undertaken major software initiatives to ameliorate software-related problems associated with major computer systems acquisition. This thesis provides an overview of common problems in both embedded and administrative software development and acquisition. It defines quality software in terms of its characteristics, and provides the project manager/acquisition agency with a set of accepted controls to assure that quality is built into software for improved maintainability. The difficulties and limitations of providing accurate estimates in software development are discussed in terms of software metrics. A number of DoD current and future standardization efforts are discussed, including the Army's development of a Military Computer Family (MCF), Ada, and the STARS initiative. Author (GRA)

N85-27552# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DETAILED DESIGN OF AN OBJECT ORIENTED, MULTIPROGRAMMING, MULTITASKING OPERATING SYSTEM FOR SIXTEEN-BIT MICROCOMPUTERS M.S. Thesis
J. E. Kirkpatrick Dec. 1984 529 p
(AD-A152086; AFIT/GCS/ENG/84D-14) Avail: NTIS HC A23/MF A01 CSCL 09/2

A detailed design of an object oriented multiprogramming multitasking operating system (OS) intended for implementation on sixteen-bit microcomputers has been developed. The OS is designated the AFIT Multiprogramming Operating System (AMOS). This design separates the OS into major areas on the basis of resources managed: processes, I/O, memory, and files. The process management, I/O management, and memory management areas of AMOS are broken down into objects which form the basic building blocks of the OS. The design is developed through the commonly accepted steps of the Software Development Life Cycle: system requirements definition, functional requirements specification, preliminary design, and detailed design. GRA

N85-27553# Pennsylvania State Univ., University Park. Dept. of Statistics.
A DATA BASED ALGORITHM FOR CHOOSING THE WINDOW WIDTH WHEN ESTIMATING THE INTEGRAL OF F2(X)
S. J. Sheather and T. P. Hettmansperger Mar. 1985 29 p
(Contract N00014-80-C-0741)
(AD-A152093; TR-52) Avail: NTIS HC A03/MF A01 CSCL 12/1

A review of different density estimation approaches is given. A new data-based algorithm for choosing the window width when estimating gamma using methods of kernel density estimation is described. The results of a Monte Carlo study comparing the data-based window widths produced by the new algorithm with those produced by an existing method are also presented. Finally, an estimator which is stable over a broad set of sampling situations is recommended. GRA

N85-27554# Naval Postgraduate School, Monterey, Calif.
NUMERICAL OPTIMIZATION ALGORITHM FOR ENGINEERING PROBLEMS USING MICROCOMPUTER M.S. Thesis
D. S. Kim Sep. 1984 58 p
(AD-A152135) Avail: NTIS HC A04/MF A01 CSCL 09/2

A general purpose computer program is developed to perform nonlinear constrained optimization of engineering design problems. The program is developed especially for use on microcomputers and is called Microcomputer Software for Constrained Optimization Problems (MSCOP). It will accept a nonlinear objective function and up to 50 inequality constraint functions and up to 20 bounded design variables. MSCOP employs the method of feasible directions. Although developed for microcomputers, for speed of development, the MSCOP was implemented on an IBM 3033 using standard basic language, Waterloo BASIC Version 2.0. It is directly transportable to a variety of microcomputers. Typical applications of MSCOP program are in the design of machine components and simple beam and truss structures. Solutions to three sample problems are given. Author (GRA)

N85-27555# Naval Postgraduate School, Monterey, Calif.
DEVELOPMENT OF GRAPHICAL POLE-ZERO, ROOT-LOCUS, BODE, NYQUIST, AND NICHOLS RESPONSES USING THE OPTSYSX PROGRAM M.S. Thesis
M. H. Laptas Sep. 1984 220 p
(AD-A152148) Avail: NTIS HC A10/MF A01 CSCL 09/2

This thesis discussed the modification of and additions to an existing Optimal Systems Control FORTRAN Program (OPTSYS) originally obtained from Professor Arthur E. Bryson of Stanford University. This program has been subsequently redesigned to run interactively on the IBM 3033 VM/CMS by Lieutenant Commander John G. Hoden, and additions by Commander Harry A. Diel provide the user with a highly accurate graphic time response to a system designed using the OPTSYSX program. The addition of the FORTRAN program OPTGRAPH gives the user the capability to obtain classical analysis (Pole-Zero Map, Root Locus, Bode, Nyquist, and Nichols) of transfer functions, calculated for a system designed with the OPTSYSX program. The OPTGRAPH program uses high resolution precision plotting software to provide the user with highly accurate frequency response plots. This series of programs permits users to rapidly carry out simulation, analysis, and design of Optimal Systems Control problems in a totally interactive mode. Author (GRA)

N85-27556# Yale Univ., New Haven, Conn. Dept. of Computer Science.
MULTIGRID ALGORITHMS ON THE HYPERCUBE MULTIPROCESSOR
T. F. Chan and Y. Saad Feb. 1985 19 p

(Contracts N00014-82-K-0184; DE-AC02-81ER10996)
(AD-A152200; YALEU/DCS/RR-368) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper examines several ways of implementing multigrid algorithms on the hypercube multiprocessor. We consider both the standard multigrid algorithms and a concurrent version proposed by Gannon and Van Rosendale. We present several mappings of the mesh points onto the nodes of the cube. The main property of these mappings, which are based on binary reflected Gray codes, is that the distance between neighboring grid points remains constant from one grid level to another. This results in a communication effective implementation of multigrid algorithms on the hypercube multiprocessor. The hierarchy of grids in multigrid algorithms presents a speical challenge in minimizing the communicaton overhead in a parallel implementation. For even though it is possible to map the grid points of the finest grid onto many architectures such that neighboring grid points are mapped into neighboring processors, it is generally much more difficult to preserve this proximity property for the coarser grids required in the multigrid algorithms. GRA

N85-27557# Naval Postgraduate School, Monterey, Calif.
DEVELOPMENT OF GRAPHICAL TIME RESPONSE USING THE OPTSYSX PROGRAM M.S. Thesis
H. A. Diel Sep. 1984 242 p
(AD-A152221) Avail: NTIS HC A11/MF A01 CSCL 09/2

This thesis discusses the modification of and additions to an existing Optimal Systems Control FORTRAN Program (OPTSYS) originally obtained from Professor Arthur E. Bryson of Stanford University and subsequently redesigned to run interactively on the IBM 3033 VM/CMS by Lieutenant Commander John G. Hoden of the Naval Postgraduate School (NPS). The modified FORTRAN program (OPTSYSX) and the additional FORTRAN Programs (OPTCALC) and (OPTPLOT) are now designed to run interactively under VM/CMS on the IBM 3033 utilizing a library double precision numerical integration subroutine and high resolution precision plotting software to provide the user with a highly accurate time response of a system which has been designed on the OPTSYSX Program. This series of programs permits the user to rapidly design, analyze and test all types of Optimal Systems Control problems. Examples of the various types of problems are worked through to illustrate all of the capabilities available. GRA

N85-27558# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MATHEMATICAL PROGRAMMING IN COMPUTER NETWORK DESIGN M.S. Thesis
M. H. Khalifa Dec. 1984 220 p
(AD-A152275; AFIT/GCS/EE/84D-13) Avail: NTIS HC A10/MF A01 CSCL 12/1

In this thesis, the design of a distributed packet-switched computer network is addressed. This design is based on the Egyptian environments and the use of mathematical programming techniques. Two equally important problems are presented: Network Topology, and Dynamic allocation of file and program copies in such network. A cost-effective structure for such a network topology is presented. The general design problem is stated and decomposed into simpler subproblems (backbone and local access design). The available mathematical programming techniques are applied. The second important design problem also addressed is how to get the optimal dynamic file and program allocation in that developed network topology, when more than one copy is allowed in the system at any given time. The evolution of the system is represented as a finite state Markov process and Dynamic Programming is used to developing a general model. This model assigns the locations of the F/P copies dynamically to mimimize the response time and operating costs (storage and transmission). GRA

N85-27559# Systems Consultants, Inc., San Diego, Calif.
EVALUATION OF Ada (TRADEMARK) AS A COMMUNICATIONS PROGRAMMING LANGUAGE, VOLUME 1 Final Report, 4 Feb. 1983 - 15 Feb. 1985
A. L. Brintzenhoff, S. W. Christensen, D. G. Martin, and J. G. Reddan 1 Mar. 1985 219 p
(Contract DCA100-83-C-0029)
(AD-A152314) Avail: NTIS HC A10/MF A01 CSCL 09/2

This Final Phase 2 Report for the Evaluation of Ada as a Communications Programming Language documents the findings of a two-year project designed to assess the effectiveness of the use of Ada as a communications programming language. Two types of communications applications were examined: a communications protocols application with a simulated network architecture, and a trusted software application designed to arbitrate the flow of messages between a top secret and a secret system. Volume 1 of this Report: (1) defines the software applications that were implemented, (2) identifies the technical approach that was taken in collecting and analyzing the data, (3) establishes the criteria for evaluating the results of the project, (4) identifies the analysis performed on the data and information that were produced or derived, (5) documents a set of conclusions/results based on the criteria, data and analysis, (6) makes recommendations based on the conclusions and results, and (7) provides a summary of the conclusions, results, recommendations, and project retrospectives. GRA

N85-27560# Systems Consultants, Inc., San Diego, Calif.
EVALUATION OF Ada (TRADEMARK) AS A COMMUNICATIONS PROGRAMMING LANGUAGE. VOLUME 2: COMMUNICATIONS PROTOCOLS APPLICATION Final Report, 4 Feb. 1983 - 15 Feb. 1985
A. L. Brintzenhoff, S. W. Christensen, D. G. Martin, and J. G. Reddan 1 Mar. 1985 507 p
(Contract DCA100-83-C-0029)
(AD-A152315) Avail: NTIS HC A22/MF A01 CSCL 09/2

This Final Phase 2 Report for the Evaluation of Ada as a Communications Programming Language documents the findings of a two-year project designed to assess the effectiveness of the use of Ada as a communications programming language. Two types of communications applications were examined: a communications protocols application with a simulated network architecture, and a trusted software application designed to arbitrate the flow of messages between a top secret and a secret system. GRA

N85-27561# Systems Consultants, Inc., San Diego, Calif.
EVALUATION OF Ada (TRADEMARK) AS A COMMUNICATIONS PROGRAMMING LANGUAGE. VOLUME 3: TRUSTED SOFTWARE APPLICATION Final Report, 4 Feb. 1983 - 15 Feb. 1985
A. L. Brintzenhoff, S. W. Christensen, D. G. Martin, and J. G. Reddan 1 Mar. 1985 335 p
(Contract DCA100-83-C-0029)
(AD-A152316) Avail: NTIS HC A15/MF A01 CSCL 09/2

This Final Phase 2 Report for the Evaluation of Ada as a Communications Programming Language documents the findings of a two-year project designed to assess the effectiveness of the use of Ada as a communications programming language. Two types of communications applications were examined: a communications protocols application with a simulated network architecture, and a trusted software application designed to arbitrate the flow of messages between a top secret and a secret system. GRA

N85-27562# Argonne National Lab., Ill.
PROPOSAL FOR AN EXTENDED SET OF FORTRAN BASIC LINEAR ALGEBRA SUBPROGRAMS
J. J. Dongarra, J. DuCroz (Numerical Algorithms Group Ltd., Oxford, England), S. Hammarling (Numerical Algorithms Group Ltd., Oxford, England), and R. J. Hanson (Sandia Labs., Albuquerque, N. Mex.) Dec. 1984 38 p refs
(Contract W-31-109-eng-38)
(DE85-007241; ANL/MCS-TM-41) Avail: NTIS HC A03/MF A01

An extension to the set of Basic Linear Algebra Subprograms is described. The proposed extensions are targeted at matrix vector operations which should provide for more efficient and portable

implementations of algorithms for high performance computers. DOE

N85-27563# California Univ., Livermore. Lawrence Livermore Lab.
PARALLEL COMPUTATION OF MULTIPLE-SCALE PROBLEMS
R. C. Y. Chin, G. W. Hedstrom, F. A. Howes (California Univ., Davis), and J. R. McGraw 18 Jan. 1985 20 p refs Presented at ARO Workshop on New Computing Environ.: Parallel, Vector and Systolic, Stanford, Calif., 7-9 Nov. 1984
(Contract W-7405-eng-48)
(DE85-007230; UCRL-92007; CONF-8411140-3) Avail: NTIS HC A02/MF A01

The efficient use of multiprocessor computers requires the introduction of new numerical algorithms, and the identification by asymptotic analysis of concurrencies inherent in the governing equations of multiple-scale problems is a good way to develop such algorithms. The language used must be able to maintain these concurrencies. Finally, depending on the problem and the computer, this concurrency may not be sufficient to keep all the processors busy, so that the language must be able to identify additional concurrencies. These ideas are illustrated in an example based on a convection-diffusion equation. DOE

N85-27564# California Univ., Berkeley. Lawrence Berkeley Lab.
INCORPORATION OF AN ELLIPTICAL BOUNDARY CONDITION INTO THE PROGRAM POISSON
S. Caspi, M. Helm, and L. J. Laslett Dec. 1984 34 p refs
(Contract DE-AC03-76SF-00098)
(DE85-006820; LBL-18798) Avail: NTIS HC A03/MF A01

The boundary condition in electromagnetic problems such as used by the program POISSON is discussed. The analysis to permit the use of an elliptical boundary both for two dimensional and axisymmetric cylindrical problems is extended. The use of an elliptical boundary instead of a circular one reduces the mesh size when using the program POISSON and thereby save computing time. Saving cpu time can be significant for problems such as the 2-in-1 dipole proposed for the SSC or other magnets such as solenoids. The use of an elliptical boundary is expected to be more general and the previous spherical boundary solution to be a special case. DOE

N85-27565# Argonne National Lab., Ill. Mathematics and Computer Science Div.
SQUEEZING THE MOST OUT OF EIGENVALUE SOLVERS ON HIGH-PERFORMANCE COMPUTERS
Jack J. Dongarra, Linda Kaufman (AT and T Bell Lab., Murray Hill, N.J.), and Sven Hammarling (Numerical Algorithms Group Ltd., Oxford) Jan. 1985 40 p refs
(Contract W-31-109-eng-38)
(DE85-007569; ANL/MCS-TM-46) Avail: NTIS HC A03/MF A01

Modifications to many of the standard algorithms used in computing eigenvalues and eigenvectors of matrices are described. These modifications can dramatically increase the performance of the underlying software on high performance computers without resorting to assembler language, without significantly influencing the floating point operation count, and without affecting the roundoff error properties of the algorithms. The techniques are applied to a wide variety of algorithms and are beneficial in various architectural settings. DOE

N85-27566# Illinois Univ., Urbana. Dept. of Civil Engineering.
MAPPING PRINCIPLES FOR THE STANDARDS INTERFACE FOR COMPUTER AIDED DESIGN
L. A. Lopez and S. L. Elam Feb. 1985 40 p refs
(PB85-177905; NBSIR-85/3115) Avail: NTIS HC A03/MF A01 CSCL 13H

Standards must be incorporated correctly and efficiently in the computer aided design process in order that the process be correct and efficient. Standards must be programmed for data processing, checked for consistency with the project and legal requirements, and updated when these requirements are changed or updated. Programs for standards, applications programs for design, and project data bases should be distinct, but integrable, to permit each to be developed independently, but then to be widely applicable in association with other programs. Techniques developed for standards analysis, synthesis and expression (SASE) are extended to allow SASE representations of standards to serve as programs expressing the standards for use in computer aided design. Mapping principles are derived to define the data interface requirements between SASE representations of standards and applications programs. GRA

N85-26615# Fujitsu Ltd., Tokyo (Japan).
RECENT TRENDS IN SOFTWARE TECHNOLOGY FOR VECTOR PROCESSORS
Yoshiyuki Tanakura and Sachio Kamiya *In* National Aerospace Lab. Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 25-36 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26655# Air Force Armament Lab., Eglin AFB, Fla.
REUSABLE SOFTWARE: A CONCEPT FOR COST REDUCTION
Christine M. Anderson and Marlow Henne *In* AGARD Cost Effectiveness and Affordable Guidance and Control Systems Feb. 1985 6 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26753# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
INTERACTIVE DESIGN OF SPECIFICATIONS FOR AIRBORNE SOFTWARE SET (GISELE) Abstract Only
J. Choplin and D. Beurrier *In* AGARD Tech. Evaluation Rept. on the Flight Mech. Symp. on Active Control Systems Mar. 1985 p 5 (For primary document see N85-26730 16-08)
Avail: NTIS HC A02/MF A01

N85-27073# Joint Publications Research Service, Arlington, Va.
STATUS, PROSPECTS OF COMPUTER-AIDED DESIGN DISCUSSED
B. Markov *In its* USSR Rept.: Machine Tools and Metalworking Equipment (JPRS-UMM-84-010) 24 May 1985 p 18-21 Transl. into ENGLISH from Sotsialisticheskaya Industriya (USSR), 11 Mar. 1984 p 2 (For primary document see N85-27071 16-31)
Avail: NTIS HC A05

N85-27289*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GRAVITY MODEL DEVELOPMENT SOFTWARE STATUS
Barbara H. Putney *In its* Topex Gravity Model Develop. Team Activities During Fiscal Year 1984 Apr. 1985 10 p (For primary document see N85-27285 16-42)
Avail: NTIS HC A14/MF A01 CSCL 09B

N85-27301# Joint Publications Research Service, Arlington, Va.
FUJIAN FORGES AHEAD IN ELECTRONIC PRODUCTION
In its China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 49-53 refs Transl. into ENGLISH from Xinhua (Beijing, China), 19 Mar. 1985 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

62 COMPUTER SYSTEMS

Includes computer networks.

N85-27567*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPAN GRAPHICS DISPLAY UTILITIES HANDBOOK, FIRST EDITION
Dennis L. Gallagher, James L. Green, and Robert Newman (Boeing Computer Services) May 1985 11 p
(NASA-TM-86500; NAS 1.15:86500) Avail: NTIS HC A02/MF A01 CSCL 09B

The Space Physics Analysis Network (SPAN) is a computer network connecting scientific institutions throughout the United States. This network provides an avenue for timely, correlative research between investigators, in a multidisciplinary approach to space physics studies. An objective in the development of SPAN is to make available direct and simplified procedures that scientists can use, without specialized training, to exchange information over the network. Information exchanges include raw and processes data, analysis programs, correspondence, documents, and graphite images. This handbook details procedures that can be used to exchange graphic images over SPAN. The intent is to periodically update this handbook to reflect the constantly changing facilities available on SPAN. The utilities described within reflect an earnest attempt to provide useful descriptions of working utilities that can be used to transfer graphic images across the network. Whether graphic images are representative of satellite servations or theoretical modeling and whether graphics images are of device dependent or independent type, the SPAN graphics display utilities handbook will be the users guide to graphic image exchange.

Author

N85-27568# Colorado Univ., Boulder. Dept. of Computer Science.

PARALLEL COMPUTING IN OPTIMIZATION

R. B. Schnabel Oct. 1984 26 p Presented at the NATO Advanced Study Inst., Computational Math. Programming, Bad Windsheim, West Germany, Jul. 1984

(Contract DAAG29-84-K-0140)

(AD-A151812; CU-CS-282-84; ARO-21453.1-MA) Avail: NTIS HC A03/MF A01 CSCL 09/2

One of the major developments in computing in recent years has been the introduction of a variety of parallel computers, and the development of algorithms that effectively utilize their capabilities. Very little of this parallel algorithm development, however, has been in numerical optimization. Nevertheless, significant opportunities exist for the utilization of parallelism in optimization, especially on computers that support independent concurrent processes. This paper first gives a very brief survey of parallel architectures and general characteristics of parallel algorithms. Next we indicate what we see as the leading opportunities for the utilization of parallelism in optimization. Then we survey the small amount of existing research in parallel optimization; most of this has been conducted at The Hatfield Polytechnic. Finally we discuss some recently initiated research at the University of Colorado concerned with solving optimization problems by parallel algorithms suitable for implementation on a local area network of computers; we focus on a new parallel algorithm for global optimization. GRA

N85-27569# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

CONTINUED DEVELOPMENT AND IMPLEMENTATION OF THE UNIVERSAL NETWORK INTERFACE DEVICE (UNID) 2, DIGITAL ENGINEERING LABORATORY NETWORK (DELNET), VOLUME 1 M.S. Thesis

C. T. Childress, Jr. Dec. 1984 161 p

(AD-A151935; AFIT/GE/ENG/84D-17-Vol-1) Avail: NTIS HC A08/MF A01 CSCL 09/2

This research effort describes the continued development of an improved Universal Network Interface Device (UNID 2). The UNID 2's architecture was based on a preliminary design project at the Air Force Institute of Technology. The UNID 2 contains two main hardware modules: a local module for the network layer software and a network module for the datalink layer software and physical layer interface. Each module is an independent single board computer (SBC) residing on an Intel Multibus chassis, complete with its own memory (EPROM and RAM), serial link interfaces, and multibus interface. The local module is an iSBC 544 and the network module is an SBC 88/45. The network layer software supports the CCITT X.25 protocol, datagram option, and the data link layer software supports the CCITT X.25 LAPB (HDLC) protocol. This report documents the detailed hardware and software design, integration, validation and test of this system. GRA

N85-27570# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

CONTINUED DEVELOPMENT AND IMPLEMENTATION OF THE UNIVERSAL NETWORK INTERFACE DEVICE (UNID) 2 IN THE DIGITAL ENGINEERING LABORATORY NETWORK (DELNET), VOLUME 2 M.S. Thesis

C. T. Childress, Jr. Dec. 1984 177 p

(AD-A151947; AFIT/GE/ENG/84D-17-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 17/2

This research effort describes the continued development of an improved Universal Network Interface Device (UNID 2). The UNID 2's architecture was based on a preliminary design project at the Air Force Institute of Technology. The UNID 2 contains two main hardware modules: a local module for the network layer software and a network module for the datalink layer software and physical layer interface. Each module is an independent single board computer (SBC) residing on an Intel Multibus chassis, complete with its own memory (EPROM and RAM), serial link interfaces, and multibus interface. The local module is an iSBC 544 and the network module is an SBC 88/45. The network layer software supports the CCITT X.25 protocol, datagram option, and the data link layer software supports the CCITT X.25 LAPB (HDLC) protocol. This report documents the detailed hardware and software design, integration, validation and test of this system. GRA

N85-27571# Yale Univ., New Haven, Conn. Dept. of Computer Science.

LOCAL UNIFORM MESH REFINEMENT ON LOOSELY-COUPLED PARALLEL PROCESSORS

W. D. Gropp Dec. 1984 22 p

(Contract N00014-82-K-0184; Grants AF-AFOSR-0360-84; NSF MCS-81-06181)

(AD-A152199; YALEU/DCS/RR-352) Avail: NTIS HC A02/MF A01 CSCL 09/2

Multiprocessor systems offer large gains in performance if algorithms for real problems can be found. We show how one algorithm for solving time dependent partial differential equations, Local Uniform Mesh Refinement, can be implemented on a multiprocessor system. Care is taken to insure that communications costs are kept under control, and an estimate of the performance of this algorithm for a range of configurations is presented. Experiments on a multiprocessor system are compared with the theory. Local Uniform Mesh Refinement (LUMR) is a powerful technique for the solution of partial differential equations. It is basically a strategy for the placement of uniform grids on a coarsest mesh which reduces the amount of work by attempting to equidistribute the error committed during the calculation. The use of the uniform grids allows the computation on each of the refined grids to be done efficiently, particularly on modern vector and parallel computers. In this paper, we discuss issues in implementing LUMR on a loosely coupled system of parallel processors. GRA

N85-27572# California Univ., Livermore. Lawrence Livermore Lab. Technical Information System.

INTERNATION INFORMATION NETWORKS FOR MATERIAL PROPERTIES: REVISION 1

Viktor E. Hampel, Carol A. Gayner, Bruce E. Hegemann, Robert D. Sanner, and Y. Wolman (Hebrew Univ. of Jerusalem) Jun. 1984 55 p refs Presented at the 9th Intern. CODATA Conf., Jerusalem 24-28 Jun. 1984

(Contract W-7405-eng-48)

(DE85-007412; UCRL-90941-Rev-1; CONF-8406139-9-Rev-1) Avail: NTIS HC A04/MF A01

Available S and T resources from three continents were demonstrated. Interactive retrievals of physical and chemical data derived from seven online information systems were renewed and corresponding explanations were measured for: CAS ONLINE and NBS/OSRD in the US, CRYSTMET and F*A*C*T in Canada, DARC in France, DECHEMA in West Germany, and FMDB in Japan. This audio-visual demonstration was carried out over international packet-switching networks and regular telephone voice communications. The machine-aided translation of a sample of its French

text into English from Los Angeles, was demonstrated within the hour. DOE

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N85-27573 British Library Lending Div., Boston Spa (England).
CORRECTIVE-PREDICTIVE SYSTEMS
V. P. Avdeev, V. I. Solovev, and L. P. Myshlyaev 23 Jan. 1984 12 p refs Transl. into ENGLISH from Izv. VUZ Chern. Met. (USSR), v. 6, 1984 p 111-116
(BLL-M-36063-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The design of control systems was investigated. It is shown that the methodology of correcting and predicting reference solutions is useful to the difficult task of algorithmic synthesis of control systems for objects with substantial delays. The strict and approximate application of the method of combined structural transformations enables effective bridges to be built between the theoretical apparatus for idealized objects without delays and real situations where functional-task algorithms are made for objects with delays. The limited scope for building and operating the real objects with the required properties is done by forming combined objects of reality-model units. E.A.K.

N85-27574 British Library Lending Div., Boston Spa (England).
ALGORITHMS FOR DETERMINING THE RELATIVE COMPLEXITY OF DYNAMIC SIGNALS
Ya. G. Parparov, L. A. Sulman, and A. M. Shafir 23 Jan. 1984 14 p refs Transl. into ENGLISH from Izv. VUZ Chern. Met. (USSR), v. 7, 1984 p 138-145
(BLL-M-36111-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Measures were obtained for the relative complexity of signals entering the algorithm back-up of two-level assessment systems intended for extracting useful information from nonstationary dynamic signals, like in the measurement of the temperature and composition of liquid steel. Measures are obtained of the relative complexity of signals entering the algorithm back up of two level assessment systems that are intended for extracting useful information from nonstationary dynamic signals. E.A.K.

N85-27575*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
KINEMATIC RATE CONTROL OF SIMULATED ROBOT HAND AT OR NEAR WRIST SINGULARITY
Keith Barker, Jacob A. Houck, and Susan W. Carzoo (Sperry Corp., Hampton, Va.) May 1985 28 p refs
(NASA-TP-2440; L-15889; NAS 1.60:2440) Avail: NTIS HC A03/MF A01 CSCL 09B

A robot hand should obey movement commands from an operator on a computer program as closely as possible. However, when two of the three rotational axes of the robot wrist are colinear, the wrist loses a degree of freedom, and the usual resolved rate equations (used to move the hand in response to an operator's inputs) are indeterminant. Furthermore, rate limiting occurs in close vicinity to this singularity. An analysis shows that rate limiting occurs not only in the vicinity of this singularity but also substantially away from it, even when the operator commands rotational rates of the robot hand that are only a small percentage of the operational joint rate limits. Therefore, joint angle rates are scaled when they exceed operational limits in a real time simulation of a robot arm. Simulation results show that a small dead band avoids the wrist singularity in the resolved rate equations but can introduce a high frequency oscillation close to the singularity. However, when a coordinated wrist movement is used in conjunction with the resolved rate equations, the high frequency oscillation disappears. Author

N85-27576# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DIAGNOSIS: USING AUTOMATIC TEST EQUIPMENT AND AN ARTIFICIAL INTELLIGENCE EXPERT SYSTEM M.S. Thesis
J. E. Ramsey, Jr. Dec. 1984 367 p
(AD-A151918; AFIT/GE/ENG/84D-53) Avail: NTIS HC A16/MF A01 CSCL 09/2

This reviews three different expert systems (ATEOPS, ATEFEXPERS, and ATEFATLAS) created to direct automatic test equipment (ATE). Although related, each expert system uses a different knowledge base or inference engine and base their testing on the circuit schematic, test requirements document (TRD), or ATLAS code. Implementing generalized modules allows the expert systems to be used for any unit under test. Because of numerous errors in the ATLAS code and problems with the actual hardware connection, a fully operational system was not developed. These expert systems provide insight into the necessary knowledge bases and inference engines needed by an expert system to direct ATE. Using converted ATLAS to LISP code allows the expert system to direct any ATE using ATLAS. The CP-FRL allows the expert system to expand its control by creating the ATLAS code, checking the code for good software engineering techniques, directing the ATE, and changing the test sequence as needed. GRA

N85-27577# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
POSITIONING OF A ROBOTIC MANIPULATOR THROUGH THE USE OF VISUAL FEEDBACK M.S. Thesis
M. T. ODonnell May 1985 124 p
(AD-A151933; AFIT/CI/NR-85-20T) Avail: NTIS HC A06/MF A01 CSCL 06/4

In this thesis a system for positioning a general purpose industrial robot by means of information extracted by computer vision system is described. The specific example implemented was the interception of a moving object by a robotic manipulator based on three sequential images of the object. The techniques used and constraints imposed are discussed. The robot used is an industrial G.E. P-5 robot with five degrees of freedom. Several experiments used to evaluate the various components of system error were run. The results of these experiments were compared to the behavior of a linear predictive Kalman filter model of the system. A list of conclusions is presented along with a discussion of particular areas where improvements of this system can be made. A listing of the FORTRAN programs used and an outline of the camera-robot coordinate system calibration process are included in the appendices. Author (GRA)

N85-27578# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ARTIFICIAL INTELLIGENCE IN SPACE PLATFORMS M.S. Thesis
M. A. Wright Dec. 1984 139 p
(AD-A152078; AFIT/GSO/OS/84D-9) Avail: NTIS HC A07/MF A01 CSCL 06/4

This thesis determined the feasibility of implementing Artificial Intelligence techniques on orbiting spacecraft. The main thrust was to evaluate the current technology of expert systems (computer programs) and determine their value to satellite tasking. The goal for an expert system to be effective was that it must be able to perform spacecraft stationkeeping without ground assistance. Analysis began by outlining the basic functions of the DSCS III and noting deficiencies could be corrected with conventional computer programming, but stationkeeping required AI techniques for proper execution. Expert systems were then examined and studied for applicability to the primary task of orbit maintenance. R1, an expert system designed to perform computer configuration, was found to be a good baseline for comparison and further development. The process of orbit maintenance, as currently done by human experts, was explained and outlined for expert system design. Finally, a cost analysis provided information which supported further development of AI technology for spacecraft implementation. GRA

N85-27579# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
RESEARCH IN KNOWLEDGE REPRESENTATION FOR NATURAL LANGUAGE UNDERSTANDING Final Report, 1 Sep. 1977 - 31 Dec. 1984
C. Sidner Feb. 1985 13 p
(Contract N00014-77-C-0378; ARPA Order 3414)
(AD-A152260; BBN-5899) Avail: NTIS HC A02/MF A01 CSCL 06/4

BBN's ARPA project in Knowledge Representation for Natural Language Understanding is aimed at developing techniques for rendering computer-based assistance to a decision maker who is attempting to understand and react to a complex, evolving situation. This report summarizes our research in knowledge representation and natural language over the length of the contract. In particular, we discuss the development of KL-ONE, NIKL, and KL-TWO, the advances in RUS and the PSI-KLONE systems, and our work in understanding discourse and speaker's intentions. GRA

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N85-27580 Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
SOLVING THE MINIMAL LEAST SQUARES PROBLEM SUBJECT TO BOUNDS ON THE VARIABLES
Per Loetstedt [1984] 31 p refs
(TRITA-NA-8215) Avail: NTIS HC A03/MF A01

A computational procedure was developed to determine the solution of minimal length to a linear least squares problem subject to bounds on the variables. In the first stage, a solution to the least squares problem is computed and the solution of minimal length is determined in the second stage. The objective function in each step is minimized by an active set method adapted to the special structure of the problem. The systems of linear equations satisfied by the descent direction and the Lagrange multipliers in the minization algorithm are solved by direct methods based on QR decompositions or iterative preconditioned conjugate gradient methods. The direct and the iterative methods are compared in numerical experiments, where the solutions are sought to a sequence of related, minmial least squares problems subject to bounds on the variables. The application of the iterative methods to large, sparse problems is also discussed. E.A.K.

N85-27581 Polish Academy of Sciences, Warsaw. Dept. of Electromagnetic Wave Theory.
ASYMPTOTIC SOLUTIONS OF MHD EQUATIONS WITH FINITE CONDUCTIVITY [ASYMPTOTYCZNE ROZWIAZANIA ROWNAN MHD ZE SKONCZONA PRZEWODNOSCIA]
Wlodzimierz Laprus 1984 18 p refs In POLISH
(Rept-12/1984; ISSN-0208-5658) Avail: Issuing Activity

Two types of asymptotic solutions of magnetohydrodynmic equations are proposed. The progressive wave method is applied to magnetohydrodynamic equations with finite conductivity and to transmission line equations with damping. Transl. by B.G.

N85-27582*# Brigham Young Univ., Provo, Utah. Coll. of Engineering Science and Technology.
A FAST HIDDEN LINE ALGORITHM WITH CONTOUR OPTION M.S. Thesis
Ronald E. Thue Dec. 1984 123 p refs
(Grant NAG1-391)
(NASA-CR-175803; NAS 1.26:175803) Avail: NTIS HC A06/MF A01 CSCL 12A

The JonesD algorithm was modified to allow the processing of N-sided elements and implemented in conjunction with a 3-D contour generation algorithm. The total hidden line and contour subsystem is implemented in the MOVIE.BYU Display package, and is compared to the subsystems already existing in the MOVIE.BYU package. The comparison reveals that the modified JonesD hidden line and contour subsystem yields substantial processing time savings, when processing moderate sized models comprised of 1000 elements or less. There are, however, some limitations to the modified JonesD subsystem. A.R.H.

N85-27583*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ON THE RELATION BETWEEN UPWIND-DIFFERENCING SCHEMES OF GODUNOV, ENGQUIST-OSHER AND ROE
Bram vanLeer (Leiden Univ.) 16 Mar. 1981 40 p refs
(Contract NAS1-14472)
(NASA-CR-175805; NAS 1.26:175805; ICASE-81-11) Avail: NTIS HC A03/MF A01 CSCL 12A

The upwind differencing first order schemes of Godunov, Engquist-Osher and Roe are discussed on the basis of the inviscid Burgers equations. The differences between the schemes are interpreted as differences between the approximate Riemann solutions on which their numerical flux functions are based. Special attention is given to the proper formulation of these schemes when a source term is present. Second order two step schemes, based on the numerical flux functions of the first order schemes are also described. The schemes are compared in a numerical experiment, and recommendations on their use are included. Author

N85-27584*# Pratt and Whitney Aircraft, East Hartford, Conn. Engineering Div.
ERROR REDUCTION PROGRAM Final Report
Saadat A. Syed, Louis M. Chiappetta, and A. D. Gosman 11 Jan. 1985 246 p refs
(Contract NAS3-23686)
(NASA-CR-174776; NAS 1.26:174776; PWA-5928-25) Avail: NTIS HC A11/MF A01 CSCL 12A

The details of a study to select, incorporate and evaluate the best available finite difference scheme to reduce numerical error in combustor performance evaluation codes are described. The combustor performance computer programs chosen were the two dimensional and three dimensional versions of Pratt & Whitney's TEACH code. The criteria used to select schemes required that the difference equations mirror the properties of the governing differential equation, be more accurate than the current hybrid difference scheme, be stable and economical, be compatible with TEACH codes, use only modest amounts of additional storage, and be relatively simple. The methods of assessment used in the selection process consisted of examination of the difference equation, evaluation of the properties of the coefficient matrix, Taylor series analysis, and performance on model problems. Five schemes from the literature and three schemes developed during the course of the study were evaluated. This effort resulted in the incorporation of a scheme in 3D-TEACH which is usualily more accurate than the hybrid differencing method and never less accurate. M.G.

N85-27585# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
STABILITY OF FUNCTIONALS DETERMINED BY MOMENT CONDITIONS
Sven-Ake Gustafson [1985] 19 p refs Prepared in cooperation with Australian National Univ., Canberra
(TRITA-NA-8310; CMA-R10-83) Avail: NTIS HC A02/MF A01

A very large class of problems may be cast into the form of evaluating a linear functional, which is determined by infinitely many linear conditions in the form of moments. The stability of the value of the functional when the moment data are perturbed, generally by small amounts is investigated. The results obtained here may be applied to various tasks such as the summation of power series, evaluation of Fourier and Laplace transforms and numerical quadrature of product type. Author

N85-27586# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
EXPLICIT CONSTRUCTION OF CONTRACTIVITY MATRICES
Demetre Betsis [1985] 10 p ref

(TRITA-NA-8309) Avail: NTIS HC A02/MF A01

Given rho, sigma method and a point r is an element of R a positive definite matrix G is constructed, such that the G-profile touches the spectral profile at r and satisfies certain extremal properties. Author

N85-27587# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.

H-SETS, CONVEX PROGRAMMING AND CONSTRAINED APPROXIMATION

M. Brannigan (Georgia Univ.) and Sven-Ake Gustafson [1985] 23 p refs Prepared in cooperation with Australian National Univ., Canberra

(TRITA-NA-8308; CMA-R06-83) Avail: NTIS HC A02/MF A01

The use of H-sets has been shown to be important for the study of unconstrained Chebyshev approximation. This concept is extended to the problem of convex programming, linear semi-infinite programming and linear Chebyshev approximation with linear constraints. The relationship between the theory of H-sets in Chebyshev approximation and semi-infinite programming is investigated. A method for detecting inconsistencies in constrained approximation for alogorithms using the dual formulation is discussed. M.G.

N85-27588*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

FINITE ELEMENTS AND THE METHOD OF CONJUGATE GRADIENTS ON A CONCURRENT PROCESSOR

Gregory A. Lyzenga, Arthur Raefsky, and Bradford H. Hager (California Inst. of Tech., Pasadena) [1984] 5 p refs

(NASA-CR-175812; NAS 1.26:175812) Avail: NTIS HC A02/MF A01 CSCL 12A

An algorithm for the iterative solution of finite element problems on a concurrent processor is presented. The method of conjugate gradients is used to solve the system of matrix equations, which is distributed among the processors of a MIMD computer according to an element-based spatial decomposition. This algorithm is implemented in a two-dimensional elastostatics program on the Caltech Hypercube concurrent processor. The results of tests on up to 32 processors show nearly linear concurrent speedup, with efficiencies over 90% for sufficiently large problems. Author

N85-27589*# Tel-Aviv Univ. (Israel). School of Mathematical Sciences.

UNIFORMLY HIGH-ORDER ACCURATE NON-OSCILLATORY SCHEMES, 1

Ami Harten and Stanley Osher 10 Jun. 1985 59 p refs Sponsored in part by National Science Foundation

(Contract NCA2-IR390-403; Grants NAG1-270; NAG1-506; Contract DAAG29-80-C-0041)

(NASA-CR-175768; NAS 1.26:175768) Avail: NTIS HC A04/MF A01 CSCL 12A

The construction and the analysis of nonoscillatory shock capturing methods for the approximation of hyperbolic conservation laws was begun. These schemes share many desirable properties with total variation diminishing schemes (TVD), but TVD schemes have at most first order accuracy, in the sense of truncation error, at extreme of the solution. A uniformly second order approximation was constucted, which is nonoscillatory in the sense that the number of extrema of the discrete solution is not increasing in time. This is achieved via a nonoscillatory piecewise linear reconstruction of the solution from its cell averages, time evolution through an approximate solution of the resulting initial value problem, and averaging of this approximate solution over each cell. Author

N85-27590# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

AN INTERPOLATION METHOD WITH THE POSSIBILITY OF FIRST DERIVATIVE CORRECTION [UM METODO DE INTERPOLACAO COM POSSIBILIDADE DE CORRIGIR AS PRIMEIRAS DERIVADAS]

Nandamudi Lankalapalli Vijaykumar and Jose Antonio Goncalves Pereira Nov. 1984 12 p refs In PORTUGUESE Presented at the 5th Encontro dos Matematicos, Presidente Prudente, Brazil, 22-24 Nov. 1984

(INPE-3352-PRE/631) Avail: NTIS HC A02/MF A01

An interpolative method for the computer is described that has the possibility of first-derivative correction. The method for correcting intrinsic inclinations of the generated curve can be applied totally or only at certain points. Principles of interactive computer graphics are discussed. The Coons, Bezier, and Spline interpolative methods are described. Transl. by B.G.

N85-27591# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

SURFACE INTERPOLATION USING WEIGHTED SPLINES

Nandamudi Lankalapalli Vijaykumar and Jose Antonio Goncalves Pereira Jan. 1985 16 p refs Proposed for presentation at Eurographics 85 - European Computer Graphics Conf. and Exhibition, Nice, 9-13 Sep. 1985

(INPE-3387-PRE/658) Avail: NTIS HC A02/MF A01

The surface generating method proposed by Coons is extensively used in designing automobile bodies, ship hulls and other complex forms which are impossible to describe analytically. In order to describe the cages, which basically provide these surfaces, Bezier or B-Spline methods are traditionally used. These methods have a disadvantage, since the control points do not belong to the generated curves and this creates difficulties in modifying the design. A method known as weighted splines is proposed which is computational efficient and without the restriction regarding the control points, since, in this method, they belong to the generated curves. The method is also shown to be a particular case of Coons' ideas. In addition, a method to allow the setting of derivatives of the curve at the desired points is also presented, in which even a discontinuity may be generated when necessary. M.G.

N85-27592# Tata Inst. of Fundamental Research, Bombay (India). School of Mathematics.

SCHUBERT VARIETIES ARE ARITHMETICALLY COHEN-MACAULAY

A. Ramanathan [1983] 23 p refs

Avail: NTIS HC A02/MF A01

Any Schubert variety - X was proven to be Cohen-Macaulay, has rational singularities, and it is in any projective embedding given by an ample line bundle on G/Q/arithmetically Cohen-Macaulay. The G is a semisimple algebraic group over an algebraically closed field of arbitrary characteristics while B is a Borel subgroup and Q is an element of B a parabolic subgroup of G. A Schubert variety is the closure of a B-orbit in G/Q. For Schubert varieties in Grassmannians such results were proven by Hochster, Kempf, Laksov and Musili. When Q is of classical type it was proven by DeConcini and Lakshmibai. The SL(n) result is due to Seshadri and Musili. E.A.K.

N85-27593# Tata Inst. of Fundamental Research, Bombay (India).

QUADRATIC SPACES OVER DISCRETE HODGE ALGEBRAS

S. Mandal [1984] 10 p refs

Avail: NTIS HC A02/MF A01

The analogue of Serre's conjecture for discrete Hodge algebras over fields was proven. More results about modules over polynomial rings were extended to discrete Hodge algebras. Similar results about quadratic space are extended to discrete Hodge algebras. Two theorems are proven, which both are extensions of Parimalas theorems. It is proven that all quadratic spaces over discrete Hodge algebras over dedikind domains are extendable from the base ring. The theorem states that quadratic forms with sufficient Witt index are cancellative. E.A.K.

N85-27594# Colorado School of Mines, Golden. Center for Wave Phenomena.

BORN INVERSION WITH A STRATIFIED REFERENCE VELOCITY

Jack K. Cohen and Frank G. Nagin 8 Dec. 1984 49 p refs

(Contract N00014-84-K-0049; NR Proj. SRO-159)

(AD-A149222; CWP-008) Avail: NTIS HC A03/MF A01 CSCL 12/1

The derivation of the inversion algorithm for backscattered (stacked) seismic data is discussed. The essence of the derivation presented is to form an inversion operator with a suitable pre-specified phase, but unknown amplitude. The amplitude is then determined by demanding that for high frequency synthetic scattering data from a fairly general surface, the algorithm asymptotically produce the correct reflectivity. B.W.

N85-27595# Georgia Inst. of Tech., Atlanta. Production and Distribution Research Center.

A DECOMPOSITION PROCEDURE FOR CONVEX QUADRATIC PROGRAMS

C. M. Shetty and M. B. Daya Jan. 1985 13 p

(Contract N00014-83-K-0147)

(AD-A151732; AD-E301625; PDRC-85-01) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper deals with the solution of convex quadratic programs by iteratively solving a master problem and a subproblem as proposed previously by Sacher. The approach has the advantage that the subproblems are linear programs so that existing schemes for solving large problems can be taken advantage of. This paper gives a closed form solution to the master problem so that the procedure is well suited for solving large quadratic programs and can take advantage of the constraint structure. GRA

N85-27596# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

SCENE ANALYSIS USING RECURSIVE FREQUENCY DOMAIN CORRELATION WITH ENERGY NORMALIZATION M.S. Thesis

R. L. Mills Dec. 1984 184 p

(AD-A151777; AFIT/GEO/ENG/84D-3) Avail: NTIS HC A09/MF A01 CSCL 12/1

This thesis describes a scene analysis algorithm which locates targets in a noisy background. Preprocessing is used to detect the edges of objects in a digitized scene. The edges extracted from the scene is then cross-correlated with a template of the target to be found. Cross-correlation is done by using complex-conjugate multiplication in the frequency domain. Areas of high correlation are recorrelated using smaller images which can be processed faster. The potential targets are energy normalized with respect to the template in order to eliminate false correlation with noise. Even in a scene with high energy noise, the algorithms works very well when operated under the constraints of size, orientation, and perspective. GRA

N85-27597# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

SOME NEW RESULTS ON THE DISCRETE-TIME RICCATI EQUATION AND THEIR USE IN THE DESIGN OF OPTIMAL REGULATORS AND OBSERVER-ESTIMATORS Ph.D. Thesis

C. D. Corsetti 31 May 1984 258 p

(AD-A151934; AFIT/DSL/ENG/84J-1) Avail: NTIS HC A12/MF A01 CSCL 12/1

Some new results on the discrete-time Riccati Equation and their use in the design of optimal regulators and observer-estimators are presented. Special attention is given to problems unique to the discrete-time case: the possibility of a singular control-effort weighting matrix in the case of the regulator and noise-free measurements in the case of the observer-estimator. The solution to this singular case leads to results on the eigenstructure of the closed-loop system matrix and to its relationship with recent developments in linear system theory, and in particular with the output deadbeat response. In the case of the regulator, design procedures based on the selection of weights on the states in the LQ cost criterion are presented. In the case of the observer-estimator, a full-state loop transfer recovery procedure is presented. Procedures for both the regulator and observer-estimator design are applied to the design of a stability augmentation system (SAS) for the F-4 aircraft. GRA

N85-27598# Yale Univ., New Haven, Conn. Dept. of Computer Science.

COMPLEXITY OF DENSE LINEAR SYSTEM SOLUTION ON A MULTIPROCESSOR RING

I. C. F. Ipsen, Y. Saad, and M. H. Schultz Jan. 1985 29 p

(Contract N00014-82-K-0184)

(AD-A151970; YALEU/DCS/RR-349) Avail: NTIS HC A03/MF A01 CSCL 12/1

Different algorithms, based on Gaussian elimination, for the solution of dense linear systems of equations, are discussed for a multiprocessor ring. The number of processors is assumed not to exceed the problem size. A fairly general model for data transfer is proposed and the algorithms are analyzed with respect to their requirements of arithmetic as well as communication times. This paper lays no claims to being either exhaustive or complete. Its objective is to compare a variety of algorithms, which are fairly reasonable to program and to analyse, for the solution of a single problem on a certain class of parallel architectures, thereby leading to a more realistic approach to future algorithm development on multiprocessor machines. GRA

N85-27599# Royal Signals and Radar Establishment, Malvern (England).

AN IKBS APPROACH TO IMAGE UNDERSTANDING

A. C. Sleigh and D. B. Hearn Oct. 1984 30 p

(AD-A151992; RSRE-MEMO-3683; BR94355) Avail: NTIS HC A03/MF A01 CSCL 12/1

This memorandum describes a method for extracting 2-Dimensional and 3-Dimensional shapes from scenes made up entirely of straight line segments. A new approach to extracting boundaries is discussed, and a methodology for defining geometrical shapes in PROLOG illustrated. Emphasis is placed on the structuring and control strategy for efficient implementation, and the applicability of IKBS methods to this is demonstrated. Author (GRA)

N85-27600# Royal Aircraft Establishment, Farnborough (England).

EVALUATION OF AN ALGORITHM FOR THE SOLUTION OF THE TIME-DEPENDENT EULER EQUATIONS

D. J. Salmond Jun. 1984 48 p

(AD-A151993; RAE-TM-AERO-1980; BR94099) Avail: NTIS HC A03/MF A01 CSCL 12/1

In this Memorandum the application to one-dimensional moving shock problems of the counterpart of the algorithm developed to solve the two-dimensional Euler equations by Pulliam and Steger is examined. Numerical results obtained using the algorithm are presented and compared with the exact analytical solutions. Transonic flow; One-dimensional flow. GRA

N85-27601# Naval Postgraduate School, Monterey, Calif.

A MATHEMATICAL MODEL FOR CALCULATING DETECTION PROBABILITY OF A DIFFUSION TARGET M.S. Thesis

M. Sislioglu Sep. 1984 70 p

(AD-A152026) Avail: NTIS HC A04/MF A01 CSCL 12/1

The primary objective of this thesis is to derive a mathematical model to predict the detection probability of a target which moves randomly, according to a two-dimensional diffusion model. This model assumes that there is a stationary searcher which has a cookie cutter sensor with radius R. In order to construct this model, a Monte Carlo simulation program is used to generate detection probabilities. It is demonstrated that this model can be used asymptotically to predict an upper bound detection probability of an equivalent random tour target. Author (GRA)

N85-27602# North Carolina Univ., Chapel Hill. Dept. of Statistics.

SOME NEW ESTIMATION METHODS FOR WEIGHTED REGRESSION WHEN THERE ARE POSSIBLE OUTLIERS

David M. Giltinan (Merek Sharp and Dohme Research Labs., Rahway, N.J.), Raymond J. Carroll, and David Ruppert Jan. 1985 31 p

(Contract F49620-82-C-0009; Grant NSF MCS-81-00748)

(AD-A152104; MIMEO-SER-1571; AFOSR-85-0264TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

The problem of estimating the variance parameter robustly in a heteroscedatic linear model is considered. The situation where the variance is a function of the explanatory variables is treated. To estimate the variance robustly in this case, it is necessary to guard against the influence of outliers in the design as well as outliers in the response. By analogy with the homoscedastic regression case, two estimators are proposed which do this. Their performance is evaluated on a number of data sets. The authors had considerable success with estimators that bound the self-influence, that is, the influence on observation has on its own fitted value. The authors conjecture that in other situations, for example, homoscedastic regression, bounding the self-influence will lead the estimators with good robustness properties.
Author (GRA)

N85-27603# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A HEURISTIC SOLUTION TO THE SPACING PROBLEM: MAXIMIZING THE MINIMUM EUCLIDEAN DISTANCE AMONG N POINTS IN A CONVEX REGION M.S. Thesis
R. E. Roley Dec. 1984 92 p
(AD-A152116; AD-E401303; AFIT/GOR/OS/84D-10) Avail: NTIS HC A05/MF A01 CSCL 09/2

This thesis introduces a new method for solving the problem of optimally spacing points in a three-dimensional region so that their distances from each other are as great as possible. One application of the problem deals with color selection for aircraft displays where the colors are plotted as points in a three-dimensional color space and the distance between two points is directly related to the distinguishability of the two colors. The method itself is a heuristic algorithm very similar to one designed by Carter and Carter. The newer algorithm apparently yields similar solutions with fewer runs, but because it is more thorough, it is slower. The program was tested on problems as large as 23 points whose feasible region had seven faces. The major disadvantage of this new method is that its solutions are not guaranteed to be optimal. As a result, the user must perform several replications of various randomly selected starting locations in order to increase the chances of achieving an optimal solution. Author (GRA)

N85-27604# Naval Postgraduate School, Monterey, Calif.
SENSITIVITY OF CONDITIONS FOR LUMPING FINITE MARKOV CHAINS M.S. Thesis
M. T. Suh Sep. 1984 40 p
(AD-A152122; AD-E401303) Avail: NTIS HC A03/MF A01 CSCL 12/1

Markov chains with large transition probability matrices occur in many applications such as manpower models. Under certain conditions the state space of a stationary discrete parameter finite Markov chain may be partitioned into subsets, each of which may be treated as a single state of a smaller chain that retains the Markov property. Such a chain is said to be lumpable and the resulting lumped chain is a special case of more general functions of Markov chains. There are several reasons why one might wish to lump. First, there may be analytical benefits, including relative simplicity of the reduced model and the development of a new model which inherits known or assumed strong properties of the original model (the Markov property). Second, there may be statistical benefits, such as increased robustness of the smaller chain as well as improved estimates of transition probabilities. Finally, the identification of lumps may provide new insights about the process under investigation. However, a problem arises in connection with practical applications of Markov chain models is to determine whether the chain is lumpable. This thesis examines the sensitivity of lumping conditions. GRA

N85-27605# Navy Underwater Sound Lab., New London, Conn. New London Lab.
AN OVERVIEW OF STOCHASTIC SIGNAL MODELING
D. H. Wood and J. S. Papadakis 20 Feb. 1985 18 p
(F59-552)
(AD-A152144; NUSC/TR-7267) Avail: NTIS HC A02/MF A01 CSCL 12/1

Knowing the average value of a fluctuating acoustics field is not enough to provide criteria for the design of sonar systems. More important are the statistics that measure the decorrelations of the field and its intensity. After discussing the variabilities of the environment that affect the field, this report summarizes the four major approaches to these problems: deterministic, phenomenological, Monte Carlo, and stochastic modeling. Two different courses of action are recommended for computing the desired statistics. In the first course, existing models, each dealing with some effects and ignoring others, can be linked to handle the simplest problems. In the second course, a Monte Carlo approach is recommended for more difficult problems, although its generality is gained at the expense of intensive computer usage. GRA

N85-27606# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ADAPTIVE GRID GENERATION FOR NUMERICAL SOLUTION OF BURGER'S EQUATION M.S. Thesis
B. D. Boyd Dec. 1984 90 p
(AD-A152217; AFIT/GAE/AA/84D-2) Avail: NTIS HC A05/MF A01 CSCL 12/1

An adaptive grid generation method is presented which is based on the reduction of truncation error in the computational plane. Grid adaption is achieved through minimization of the third derivative of the dependent variable in the computational plane. Burger's equation is solved because it represents typical nonlinear fluid-flow equations. An optimized Successive-Over-Relaxation method is used to solve Burger's equation using second-order-upwind differences for the convective term. Results are presented for several cases which are compared to the results of a test case. The results show grid points are concentrated in high gradient regions. GRA

N85-27607# Princeton Univ., N. J. Dept. of Electrical Engineering and Computer Science.
TOPICS IN TIME DELAY ESTIMATION Ph.D. Thesis Technical Report, Sep. 1982 - Oct. 1984
A. O. Hero and S. C. Schwartz Feb. 1985 211 p
(Contract N00014-81-K-0146)
(AD-A152231; TR-16) Avail: NTIS HC A10/MF A01 CSCL 12/1

Time delay estimation forms the base from which passive localization and tracking may function accurately. This report considers both the practical and theoretical aspects of time delay estimation when classical optimal estimation techniques break down. Of special concern are two adverse situations: the underlying statistics of the observations are incompletely specified; and the observations contain a narrowband component. GRA

N85-27608# Harvard Univ., Cambridge. Mass. Aiken Computation Lab.
EFFICIENT PARALLEL PSEUDO-RANDOM NUMBER GENERATION
J. H. Reif and J. D. Tygar Nov. 1984 19 p
(Contract N00014-80-C-0647)
(AD-A152235; TR-07-84) Avail: NTIS HC A02/MF A01 CSCL 12/1

A number of parallel randomized algorithms have appeared recently. These algorithms typically use a large number of random bits which must be generated in a small amount of time. Nonetheless, the area of parallel random bit generation remains unexplored. This document presents a parallel algorithm for pseudo-random number generation. GRA

N85-27609# Naval Postgraduate School, Monterey, Calif.
LOCALLY-WEIGHTED-REGRESSION SCATTER-PLOT SMOOTHING (LOWESS): A GRAPHICAL EXPLORATORY DATA ANALYSIS TECHNIQUE M.S. Thesis
G. W. Moran Sep. 1984 86 p
(AD-A152239) Avail: NTIS HC A05/MF A01 CSCL 12/1

Statisticians have long used moving average type smoothing and classical regression analysis techniques to reduce the variability in data sets and enhance the visual information presented by

scatterplots. This thesis examines the effectiveness of Robust Locally Weighted Regression Scatterplot Smoothing (LOWESS), a procedure that differs from other techniques because it smooths all of the points and works on unequally as well as equally spaced data. The LOWESS procedure is evaluated by comparing it to previously validated uniform and cosine weighted moving average and least squares regression programs. Interactive APL and FORTRAN programs and detailed user instructions are included for use by interested readers. GRA

N85-27610# Army Missile Command, Redstone Arsenal, Ala. Guidance and Control Directorate.
UTM (UNIVERSAL TRANSVERSE MERCATOR) DETERMINATIONS FROM GEOGRAPHICAL DATA
D. S. Rush Jun. 1984 19 p
(AD-A152293; AD-E950674; AMSMI/RG-84-13-TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The purpose of this study was to determine an accurate closed loop solution for calculating northing values along the central meridian. This report derives and evaluates three different techniques for determining this distance. Author (GRA)

N85-27611# Los Alamos Scientific Lab., N. Mex.
NONLINEAR DSA DIFFERENCE SCHEMES FOR RADIATIVE TRANSFER APPLICATIONS
Bradley A. Clark 1985 15 p refs Presented at Advan. in Nucl. Eng. Computational Methods: Am. Nucl. Soc. Math. and Computational Topical Meeting, Knoxville, Tenn., 9-11 Apr. 1985
(Contract W-7405-eng-36)
(DE85-005729; LA-UR-84-3902; CONF-850411-4) Avail: NTIS HC A02/MF A01

A 3-point nonlinear difference scheme for diffusion synthetic acceleration (DSA) of the radiation transport equation is described. The new scheme is compared with standard 1-point method on two test problems. In addition, the two DSA methods are used to accelerate a variety of discrete-ordinates difference schemes. The methods are very effective in accelerating the convergence of the transport iteration. Each of the DSA methods is accelerated by grey, or one-group, diffusion acceleration equation, which is also successful in increasing efficiency. The new 3-point method is at least 50% faster than the 1-point DSA method; the advantage grows with increasing difficulty of the problem and tighter convergence criteria. The new acceleration method reduces computer time by at least 1 order of magnitude compared to unaccelerated calculations. DOE

N85-27612# Washington Univ., Seattle. Dept. of Physics.
COCYCLES AND MAGNETIC MONOPOLE
Y. S. Wu and A. Zee 1984 12 p refs
(Contract DE-AC06-81ER-40048)
(DE85-007797; DOE/ER-40048/29-P4) Avail: NTIS HC A02/MF A01

The meaning of 3-cocycle in group representation theory is discussed. An example involving the translation group in the presence of a Dirac monopole is given. Various anomalous structures in gauge theories have been discussed in terms of infinitesimal gauge transformations. Now it is shown that by using the language of cochains and cocycles one can give a unified treatment of anomalous behavior under large gauge transformations, i.e., at the LIE group level. DOE

N85-27613# Helsinki Univ. of Technology, Espoo (Finland). Inst. for Mathematics.
ANALYSIS OF THE CONVERGENCE OF MIXED FINITE ELEMENT METHODS Ph.D. Thesis
Rolf Stenberg Nov. 1984 13 p refs Sponsored by Academy of Finland, Swedish Academy of Technical Sciences, Walter Ahlstroem Foundation and Iscar Oeflund Foundation
(HTKK-MAT-A227; ISBN-951-753-375-6; ISSN-0355-8126) Avail: NTIS HC A02/MF A01

The development of the finite element method is reviewed and the application of the mixed finite element method to saddle point problems is discussed. The Stokes problem in fluid mechanics is shown. Author (ESA)

N85-27614# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
THE VECTOR POTENTIAL IN A BRANCHED RIEMANN SPACE
G. Schouten Oct. 1983 22 p refs
(VTH-LR-395) Avail: NTIS HC A02/MF A01

The use of the vector potential in problems involving a branched space was examined. Analysis shows that in branched space a line vortex has to be represented as a surface distribution of ring vortices. The problem of a ring vortex element above a half-plane is worked out. The use of the scalar potential remains slightly simpler. The problem of a straight vortex line perpendicularly crossing the edge of a half-plane is treated using the scalar potential and the vector potential. It is preferable to use the scalar potential and the Green's function formulation to using the method of images for the vector potential involving the more complicated integrals of distributions of ring vortices. Author (ESA)

N85-27615# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
ON VARIOUS FOURIER SERIES UTILIZED FOR SOLUTION OF STRUCTURAL MECHANICS PROBLEMS
I. Elishakoff (Technion - Israel Inst. of Technol.) and J. vanGeer May 1984 24 p refs Sponsored by Netherlands Foundation for Technical Research and Technion Research Promotion Fund
(VTH-LR-429) Avail: NTIS HC A02/MF A01

The feasibility of using Fourier series representations in structural mechanics is illustrated by the problem of beam bending under distributed loading. It is shown that three representations of the force function, (half-range cosine, half-range sine, and mixed) yield the same final solution, and are thus valid. It is concluded that the choice should be based on considerations of simplicity and/or convenience of the solution process.
Author (ESA)

N85-26614# National Aerospace Lab., Tokyo (Japan).
AN APPROXIMATION THEORY FOR NONLINEAR EVOLUTION EQUATIONS AND SINGLE CONSERVATION LAWS
Tadayasu Takahashi and Toshiyuki Iwamiya *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 17-23 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26621# National Aerospace Lab., Tokyo (Japan).
APPLICATION OF CONFORMAL MAPPING TO GRID GENERATION
Kenji Inoue and Takashi Nakamura *In its* Proc. of the NAL Symp. on Aircraft Computational Aerodyn. 1983 p 83-90 refs In JAPANESE; ENGLISH summary (For primary document see N85-26611 16-01)
Avail: NTIS HC A10/MF A01

N85-26778# Joint Publications Research Service, Arlington, Va.
INTEGRABLE CASES OF RESTRICTED DOUBLY AVERAGED 3-BODY PROBLEM Abstract Only
M. A. Vashkovyak *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 7 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 327-334 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26779# Joint Publications Research Service, Arlington, Va.
THE 6 PI-PERIODIC SOLUTIONS OF PLANE RESTRICTED ELLIPTICAL 3-BODY PROBLEM IN NEIGHBORHOOD OF LIBRATION POINTS Abstract Only
A. Ikrotov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 7-8 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun 1984 p 335-340 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N85-27616*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN ABSTRACT SPECIFICATION LANGUAGE FOR MARKOV RELIABILITY MODELS
Ricky W. Butler Apr. 1985 17 p refs
(NASA-TM-86423; NAS 1.15:86423) Avail: NTIS HC A02/MF A01 CSCL 12A

Markov models can be used to compute the reliability of virtually any fault tolerant system. However, the process of delineating all of the states and transitions in a model of complex system can be devastatingly tedious and error-prone. An approach to this problem is presented utilizing an abstract model definition language. This high level language is described in a nonformal manner and illustrated by example. M.G.

N85-27617# New South Wales Univ., Kensington (Australia).
MULTIVARIABLE STATISTICAL MODELLING AND ITS APPLICATION Abstract Only M.S. Thesis
Lee Kong Been Jan. 1984 3 p refs
Avail: NTIS HC A02/MF A01

The study of statistical identification of discrete, dynamic, multi-input and multi-output (MIMO) linear models for complex industrial processes is examined. Contributions that have been made in this area include: (1) The development of a MIMO estimation procedure, that is computationally quite simple, to estimate the parameters in the discrete MIMO model. The resulting parameters are shown to be asymptotically equivalent to the maximum likelihood estimators; and (2) The development of a suitable methodology so that the estimation procedure can give results in the practical identification case where the data is not always ideal. Author

N85-27618# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN APPLICATION OF MARKOV CHAINS TO THE PROBLEM OF MIGRATION IN INVENTORY SYSTEMS M.S. Thesis
J. J. Hobson and R. A. Kirchoff Dec. 1984 190 p
(AD-A151954; AFIT/GOR/OS/84D-6) Avail: NTIS HC A09/MF A01 CSCL 12/1

The objective of this thesis was to model the migration of items between categories in a large inventory system as a Markov chain. The Markovian states were defined as the various inventory categories. Transition matrices were constructed from five years of quarterly data. A maximum likelihood estimate of the actual transition matrix was developed and the system was tested for stationarity and prediction capability. The transition probabilities were found to be time dependent and this led to a division of the population into two subgroups. These subgroups were then modeled as separate Markov chains. While none of the Markov models accurately described the actual system, the information gathered on the time dependent nature of the system was used to develop an alternative inventory policy. The proposed policy takes advantage of this improved understanding of the migration process and will help control inventory costs and reduce backorders in a system where forecasting demand accurately is difficult. GRA

N85-27619# Naval Postgraduate School, Monterey, Calif.
AN EVALUATION OF DISCRETIZED CONDITIONAL PROBABILITY AND LINEAR REGRESSION THRESHOLD TECHNIQUES IN MODEL OUTPUT STATISTICS FORECASTING OF VISIBILITY OVER THE NORTH ATLANTIC OCEAN M.S. Thesis
M. Diunizio Sep. 1984 234 p
(AD-A151955) Avail: NTIS HC A11/MF A01 CSCL 12/1

This report describes the application and evaluation of four primary statistical models in the forecasting of horizontal marine visibility over selected physically homogeneous areas of the North Atlantic Ocean. The main focus of this study is to propose an optimal model output statistics (MOS) approach to operationally forecast visibility at the 00-hour model initialization time and the 24-hour and 48-hour model forecast projections. The technique utilized involves the manipulation of observed visibility and Navy Operational Global Atmospheric Prediction System (NOGAPS) model output parameters. The models employ the statistical methodologies of maximum conditional probability, natural regression and minimum probable error linear regression threshold techniques. Additionally, an evaluation of the 1983 predictive arrays/equations using 1984 NOGAPS data fields and a maximum-likelihood-of-detection threshold model were accomplished. Results show that two statistical approaches, namely a maximum conditional probability strategy utilizing linear regression equation predictors and the minimum probable error threshold models, produce the best results achieved in this study. GRA

N85-27620# Stanford Linear Accelerator Center, Calif.
LOCAL LIKELIHOOD ESTIMATION Ph.D. Thesis
Robert John Tibshirani Dec. 1984 53 p refs
(Contracts DE-AC03-76SF-00515; De-AT03-81ER-10843; N00014-81-K-0340; DAAG29-82-K-0056)
(DE85-007238; SU-SLAC-275) Avail: NTIS HC A04/MF A01

The idea of local averaging is extended to likelihood based regression models. One application is in the class of generalized linear models. This class is enlarged by replacing the covariate form chi(BETA) with an unspecified smooth function s(chi). This function is estimated from the data by a technique we call Local Likelihood Estimation; a type of local averaging. Multiple covariates are incorporated through a forward stepwise algorithm. In a number of real data examples, the local likelihood technique proves to be effective in uncovering nonlinear dependencies. Some asymptotic results for local likelihood estimates are given and some methods for inference are provided. DOE

N85-27621# Oak Ridge National Lab., Tenn.
SENSITIVITY OF THE STATIONARY DISTRIBUTION VECTOR FOR AN ERGODIC MARKOV CHAIN
R. B. Funderlic and C. D. Meyer, Jr. Jan. 1985 21 p refs
(Contract DE-AC05-84OR-21400)
(DE85-006979; ORNL-6098) Avail: NTIS HC A02/MF A01

Stationary distribution vectors p/sup infinity/ for Markov chains with associated transition matrices T are important in the analysis of many models in the mathematical sciences, such as queueing networks, input-output economic models and compartmental tracer analysis models. Insight into the sensitivity of p/sup infinity/ to perturbations in the transition probabilities of T is provided and some of the difficulties in computing an accurate p/sup infinity/ is explained. The group inverse A/sup number/ of I-T is shown to be of fundamental importance in understanding sensitivity or conditioning of p/sup infinity/. The main result shows that if there is a state that is accessible from every other state and the corresponding column T has no small off diagonal elements, then p/sup infinity/ cannot be sensitive to small perturbations in T. Ecological examples are given. A new stable algorithm for calculating A/sup number/ is described. DOE

N85-27622# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
THE STATISTICAL ANALYSIS OF INITIAL IMPERFECTION MEASUREMENTS
P. G. Vermeulen, O. Elishakoff, and J. vanGeer Sep. 1984 42 p refs Sponsored by Netherlands Foundation for Technical Research
(VTH-LR-442) Avail: NTIS HC A03/MF A01

Methods for testing assumptions as to the normality of the distribution of initial imperfections in shell profiles in Monte Carlo simulations are assessed. Confidence intervals for the mean values and for the elements of the variance-covariance matrix are discussed. The Chi-squared and Kolmogoroff-Smirnoff tests are considered. Tests on a batch of seven and of four shells suggest that Chi-squared is unsuitable due to small sample size.
Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N85-27623# Army Command and General Staff Coll., Fort Leavenworth, Kansas.
COMPUTER ASSISTED FLIGHT SCHEDULE OPTIMIZATION M.S. Thesis
R. D. Drowley 1 Jun. 1984 94 p
(AD-A151689; AD-E750969) Avail: NTIS HC A05/MF A01 CSCL 05/9

This project focuses on integrating flying requirements, duties, and training accomplishments on a microcomputer to produce an optimized weekly flight schedule. The thesis includes research for and examination of earlier attempts to solve this problem as well as a detailed explanation of the method used in approaching this work. The main and supporting programs are written in U.C.S.D. Pascal. The programs use a weekly flying schedule, track pilot availability, and integrate training accomplishments to arrive at an optimized flying schedule as prioritized by squadron supervisors. GRA

N85-27624# Naval Postgraduate School, Monterey, Calif.
THE NAVTAG (NAVAL TACTICAL GAME) SYSTEM AND ITS MODIFICATION TO INCLUDE THE SH-60B HELICOPTER M.S. Thesis
F. R. Goodwin Sep. 1984 77 p
(AD-A152004) Avail: NTIS HC A05/MF A01 CSCL 15/7

The Naval Tactical Game (NAVTAG) Training Systems are to become the standard war gaming computers in fleet use to train Surface Warfare Officers in tactical operations. As modern weapons platforms are developed, they need to be modeled into NAVTAG in order that they might be included in applicable atsea engagements. In support of this objective, the SH-60B (SEAHAWK) Anti-Submarine Warfare Helicopter, which is currently not supported by NAVTAG, is incorporated into the NAVTAG system. The SH-60B is incorporated into the NAVTAG System with the full range of functions that are enjoyed by other aircraft modeled in NAVTAG. Using NAVTAG the SH-60B is tested in an AntiSubmarine Warfare (ASW) scenario developed to test its capabilities against a Soviet submarine. For comparison and testing purposes the SH-60B is also compared to the SH-2F helicopter previously modeled in NAVTAG. Both helicopters have comparable mission objectives and tactics. This is a research project to determine if NAVTAG can be modified in a research environment and with what degree of difficulty this may be accomplished. This in no way is meant to modify the Standard NAVTAG Systems that have been distributed to fleet units without the consent of the Program Manager. GRA

N85-27109*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DETERMINING AVAILABILITY CHARACTERISTICS OF DSN DATA SYSTEMS USING DISCREPANCY REPORT DATA
A. M. Ruskin and C. T. Quach *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 149-161 (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 12B

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N85-27625# Suomalainen Tiedeakatemia, Helsinki (Finland). Dept. of Mathematics
CONDITIONS FOR THE POSSIBILITY OF CONFORMAL SEWING Thesis
Juhani V. Vainio and Olli Lehto, ed. 1985 46 p refs
(ST-AASF-IMD-58; ISSN-0355-0087; ISBN-951-41-0500-1) Avail: NTIS HC A03

Two plane domains or bordered Riemann surfaces can be conformally sewn (welded) together into a single Riemann surface by an identification of two boundary arcs. A condition necessary and sufficient for the possibility of conformal sewing is imposed on the identifying homeomorphism by the requirement that the surface should have a conformal structure compatible with the original structures. Functions which sew plane domains conformally, mainly real functions are considered. The situation is defined and some straightforward consequences, primarily on the extendability of the domains and the functions, are derived. The removability of a singularity of the sewing function is considered. Arguments and results are modified to suit the slightly general situation. A number of examples are given. Locally quasiconformal homeomorphisms with the boundary function are associated, and the existence conditions are employed, where the absolute value of the complex dilatation need not be bounded away. Questions dealing with the uniquessness of the conformal maps in the definition of the sewing are considered. B.G.

N85-27626# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
THE ESSENCE OF INVEXITY
D. H. Martin Nov. 1983 22 p refs Submitted for publication
(CSIR-TWISK-321) Avail: NTIS HC A02/MF A01

The object of this study is the idea that invexity, as a generalization of convexity which is sufficient to guarantee Kuhn-Tucker sufficiently and weak duality, might be so general as to be trivially equivalent to these properties. For unconstrained problems this is true and for constrained problems the multiplier dependent invexity notions are also trivially equivalent to these properties. The main results show that while the notions of Kuhn-Tucker invexity and Wolfe dual invexity differ from Hanson's original invexity by essentially trivial modifications, their equivalence with Kuhn-Tucker sufficiently and weak duality respectively has the depth of a theorem of the alternative. Author

N85-27627# New South Wales Univ., Sydney (Australia).
EIGENVALUE APPROXIMATION METHODS FOR QUANTUM LATTICE HAMILTONIANS Ph.D. Thesis
P. Hornby [1985] 1 p
Avail: NTIS HC A02/MF A01

Problems in quantum field theory and statistical mechanics are reviewed. Although eigenvalue bounding techniques are dealt with, these techniques are applied with a view to calculating the critical properties of infinite systems. The approach advocated intends the use of approximate methods to calculate the thermodynamics of large, but finite lattices. Finite size scaling is then used to estimate the bulk system thermodynamics, especially critical phemonena, from the approximate large lattice data. Lower bounding techniques are also addressed. The use of Monte Carlo methods for quantum systems is advocated. Author

N85-27628# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PERIODIC CLUSTER SIMULATION OF A DISORDERED IMPURITY SYSTEM
M. Fabbri Mar. 1985 10 p refs Submitted for publication
(INPE-3453-PRE/705) Avail: NTIS HC A02/MF A01

An Unrestricted-Hartree-Fock-Roothan cluster study of shallow impurities in an effective-mass media is extended to incorporate periodic boundary conditions. The impurity system is divided into a number of non-interacting disordered clusters, and periodic boundary conditions are imposed on each cluster by wrapping the system into itself. In this manner, a system R(n) is simulated by clusters in a spherical surface in R(n+1) with radius much greater than the characteristic length of the assumed tight-binding potential terms (so Euclidean distances can be employed). This method facilitates computations and studying localization in each cluster. The electronic normal modes are then investigated, and the density of states and eigenfunctions localization are compared with previous models. M.G.

N85-27629# George Washington Univ., Washington, D.C. Inst. for Management Science and Engineering.

FORMULAS FOR UPDATING THE GENERALIZED INVERSE OF A SYMMETRIC MATRIX PERTURBED BY A SYMMETRIC RANK 2 MATRIX COMPOSED OF 2 NONSYMMETRIC DYADS
S. G. Leaver and G. P. McCormick 22 Jun. 1984 64 p
(Contract N00014-82-K-0412)
(AD-A151736; AD-E301625; GWU/IMSE/SERIAL-T-493/84) Avail: NTIS HC A04/MF A01 CSCL 12/1

In many applications employing a symmetric matrix and its generalized (Penrose-Moore) inverse the matrix is given in a natural way as the finite sum of symmetric dyadic matrices and pairs of nonsymmetric dyadic matrices. In this paper, formulas are given for the generalized inverse, B+, of B = A + abT + baT for A symmetric, a,b vectors. There are nine distinct cases which must be considered. The application of these formulas is given to the computation of an estimate of the positive part and directions of negative curvature for a symmetric matrix. GRA

N85-27630# Harvard Univ., Cambridge, Mass. Computation Lab.
PROBABILISTIC ALGORITHMS IN GROUP THEORY
J. H. Reif Nov. 1984 33 p
(Contract N00014-80-C-0647)
(AD-A152253; TR-01-85) Avail: NTIS HC A03/MF A01 CSCL 12/1

A finite group G is commonly presented by a set of elements which generate G. The author argues that for algorithmic purposes a considerably better presentation for a fixed group G is given by random generator set for G: a set of random elements which generate G. He bounds the expected number of random elements required to generate a given group G. The main results are probabilistic algorithms which take as inputs a random generator set of fixed permutating group G is included in S sub n. Given are O(n to the 3rd power log n) inclusion and equality. Our bounds hold for any worse case input groups; we average only over the random generators representing the groups. Our algorithms are two orders of magnitude faster than the best previous algorithms for these group theoretic problems, which required omega(n to the 5th power) time even if given random generators. Furthermore, we show that in the case the input group is a 2-group with a random presentation, than those group theoretic problems can be solved by a parallel RAM in o(log n)to the third power expected time using n sub o(1) processors. GRA

N85-27631# Oak Ridge National Lab., Tenn.
COMPUTING THE SINGULAR VALUE DECOMPOSITION OF A PRODUCT OF TWO MATRICES
M. T. Heath, A. O. Laub, C. C. Paige, and R. C. Ward Jan. 1985 20 p refs
(Contract DE-AC05-84OR-21400)
(DE85-006977; ORNL-6118) Avail: NTIS HC A02/MF A01

An algorithm is developed for computing the singular value decomposition of a product of two general matrices without explicitly forming the product. The algorithm is based on an earlier Jacobi-like method due to Kogbetliantz and uses plane rotations applied to the two matrices separately. A triangular variant of the basic algorithm is developed that reduces the amount of work required. DOE

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N85-27632 British Gas Corp., London (England).
SPECIAL FEATURES OF THE TEMPERATURE DEPENDENCE OF THE CAPILLARY CONSTANT IN THE VICINITY OF THE CRITICAL POINT
P. M. Kesselman and V. P. Zheleznyi 26 Mar. 1985 3 p Transl. into ENGLISH. from Proc. of 2nd All Union Conf. on Surface Phenomena in Liquids, 1978 p 78-79
(BLL-T6438/BG/LRS/LRST750/85) Avail: British Library Lending Div., Boston Spa, Engl.

The absence of the reliable experimental data in a wide temperature range greatly complicates the development of a method of calculating capillary constant a(2) which would yield satisfactory results for various types of materials at various temperatures. For this reason, experimental investigations were carried out into the a(2) value of six Freons. Measurements were taken using the capillary lift method with five capillaries of various diameter.Author

N85-27633# National Bureau of Standards, Washington, D.C. Office of Measurement Services.
NBS PHYSICAL MEASUREMENT SERVICES Status Report
Lottie T. McClendon, ed. and R. Keith Kirby, ed. May 1984 137 p
(NBSIR-84-2875) Avail: NTIS HC A07/MF A01

The current status of NBS's physical measurement services is described. Each of these services under five sections: Description; Documentation; Training Available; Future Directions; Contact Person at NBS is described. The services are keyed to the numerical classification of NBS Special Publication No. 250. Author

N85-27634# California Univ., Berkeley. Lawrence Berkeley Lab.
OVERVIEW OF THE PHYSICS ISSUES AT THE SSC
I. Hinchliffe Nov. 1984 44 p refs Presented at the Design and Util. of the Superconducting Super Collider Summer Study, Snowmass, Colo., 23 Jun. 1984
(Contract DE-AC03-76SF-00098)
(DE85-007074; LBL-18742; CONF-8406198-39) Avail: NTIS HC A03/MF A01

Physics issues at the SSC are reviewed. The progress made at the DPF Summer Study on the Design and Utilization of the SSC and the important problems which remain are discussed. The discussion of the physics issues is divided into Standard Model, which is the combination of QCD and the Weinberg-Salam model, and Non-Standard Physics, which includes supersymmetry, technicolor, new gauge bosons, compositeness and all the more or less speculative ideas in which theorists like to indulge. The work on identification of final states which contain W's, Z's or heavy quarks is discussed, and the impact of this work on some proposed signals for new physics is considered. The areas in which more work is required are discussed. DOE

N85-27635# Washington Univ., Seattle. Dept. of Physics.
CANONICAL ANALYSIS OF THE FERMION SECTOR IN HIGHER-DERIVATIVE SUPERGRAVITY
D. G. Boulware and S. Deser (Brandeis Univ.) Mar. 1984 11 p refs
(Contract DE-AC06-81ER-40048)
(DE85-007828; DOE/ER-40048/2-P4) Avail: NTIS HC A02/MF A01

The degree of freedom and helicity count of the fermionic sector in generic superconformal plus supergravity models is exhibited by explicit elimination of all constraints in the 3 + 1 decomposition of the action, which is given entirely in terms of gauge invariant variables. In the purely superconformal, massless case, the third derivative action describes three helicity 3/2 excitations and one of helicity 1/2. When mass is introduced by adding a Rarita-Schwinger term, a new helicity 1/2 excitation appears, and the total spectrum now consists of two massive spin 3/2 modes plus a massless one. In both cases, the excitations unavoidably emerge in sets with both signs of the Hilbert space metric; some implications of this ghost behavior are discussed. DOE

N85-26781# Joint Publications Research Service, Arlington, Va.
OPTIMUM ROTATION OF SOLID BODY WITH 1 AXIS OF SYMMETRY Abstract Only
V. N. Branets, M. B. Chertok, and Yu. V. Kaznacheyev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 9-10 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 352-360 (For primary document see N85-26772

16-12)
Avail: NTIS HC A06

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N85-27636*# Utah Univ., Salt Lake City. Dept. of Mechanical and Industrial Engineering.
ACOUSTIC PROPAGATION IN A THERMALLY STRATIFIED ATMOSPHERE Semiannual Report
W. K. VanMoorhem 7 Feb. 1985 243 p refs
(NASA-CR-175787; NAS 1.26:175787; UTEC-ME-85-014; SAR-5)
Avail: NTIS HC A11/MF A01 CSCL 20A

This report describes the activities during the fifth six month period of the investigation of acoustic propagation in the atmosphere with a realistic temperature profile. Progress has been achieved in two major directions: comparisons between the lapse model and experimental data taken by NASA during the second tower experiment, and development of a model propagation in an inversion. Data from the second tower experiment became available near the end of 1984 and some comparisons have been carried out, but this work is not complete. Problems with the temperature profiler during the experiment have produced temperature profiles that are difficult to fit the assumed variation of temperature with height, but in cases where reasonable fits have been obtained agreement between the model and the experiments are close. The major weaknesses in the model appear to be the presence of discontinuities in some regions, the low sound levels predicted near the source height, and difficulties with the argument of the Hankel function being outside the allowable range. Work on the inversion model has progressed slowly, and the rays for that case are discussed along with a simple energy conservation model of sound level enhancement in the inversion case. Author

N85-27637*# Texas Univ., Austin.
INTERACTION OF FINITE-AMPLITUDE SOUND WITH AIR-FILLED POROUS MATERIALS Final Report, 1 Sep. 1981 - 28 Feb. 1985
David A. Nelson Mar. 1985 177 p refs
(Grant NsG-3198; Contracts N00014-75-C-0867; N00014-84-K-0574)
(NASA-CR-174885; NAS 1.26:174885; ARL-TR-85-15) Avail: NTIS HC A09/MF A01 CSCL 20A

The propagation of high intensity sound waves through an air-filled porus material was studied. The material is assumed: (1) to be rigid, incompressible, and homogeneous, and (2) to be adequately described by two properties: resistivity r and porosity. The resulting wave equation is still nonlinear, however, because of the u sgn(u) term in the resistivity. The equation is solved in the frequency domain as an infinite set of coupled inhomogeneous Helmholtz equations, one for each harmonic. An approximate but analytical solution leads to predictions of excess attenuation, saturation, and phase speed reduction for the fundamental component. A more general numerical solution is used to calculate the propagation curves for the higher harmonics. The u sgn(u) nonlinearity produces a cubic distortion pattern; when the input signal is a pure tone, only odd harmonic distortion products are generated. G.L.C.

N85-27638# SACLANT ASW Research Center, La Spezia (Italy).
THE THEORETICAL RESPONSE OF A VERTICAL LINE ARRAY TO WIND-GENERATED NOISE IN SHALLOW WATER
R. M. Hamson 15 Dec. 1984 46 p
(AD-A151730; SACLANTCEN-SR-82) Avail: NTIS HC A03/MF A01 CSCL 20/1

In this NATO-furnished report a wave-theory model for the propagation of noise from a surface source layer was used to investigate the directional response of a vertical array of hydrophones to wind noise in shallow water. The model assumes an infinite layer of sources radiating sound with pressure directionality of the form COS (superscript m sub alpha), where m > or = 1 and alpha is an angle measured from the downward vertical. The field incident on the array is inhomogeneous and directional responses have been calculated from the (non-Toeplitz) spatial correlation matrix for various bottom types, sound speed profiles, and values of m up to 3. Results show that both components of the noise field - the discrete normal modes and the continuous spectrum - can contribute significantly to the total noise level and to the array response. Shallow-water noise levels are found to exceed those of an idealized, infinitely-deep ocean by approximately the amount contributed by the discrete modes. Furthermore, the discrete mode arrivals give high-array responses in near-horizontal steered directions. Thus the directional response pattern produced can be of considerably different form from that predicted by a simple correlation model for ideal conditions. The extent of these differences in both noise level and array response is strongly dependent on bottom type and on the value of the parameter m, and slightly dependent on sound-speed profile. GRA

N85-27639# Naval Postgraduate School, Monterey, Calif.
DEVELOPMENT OF A MODIFIED TIME DELAY SPECTROMETRY TECHNIQUE FOR UNDERWATER ACOUSTIC MEASUREMENTS IN A MULTIPATH ENVIRONMENT M.S. Thesis
B. Brekke Dec. 1984 96 p
(AD-A152111; AD-E401303) Avail: NTIS HC A05/MF A01 CSCL 17/1

A measurement technique has been developed which makes possible the determination of the acoustic transmission loss for various paths between a source and a receiver at relatively short ranges in the ocean. The method is based upon a technique called Time Delay Spectrometry (TDS). The theory for utilizing TDS to perform measurements on an underwater test range with a homogeneous water column is presented. The experimental parameters concerning test geometry together with criteria for the source signal are discussed and the limitations are described. A computer program written in HP BASIC is the tool in a multipath measurement system where analog sound signals recorded on tape are processed by an HP 356A Dynamic Signal Analyzer under program control. GRA

N85-27640# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EXPERIMENTAL INVESTIGATION OF THE PULSED PHOTO-ACOUSTIC EFFECT PRODUCED ON A SOLID SURFACE M.S. Thesis
H. Yoon Dec. 1984 69 p
(AD-A152114; AD-E401303; AFIT/GEO/PH/84D-6) Avail: NTIS HC A04/MF A01 CSCL 20/1

The purpose of this investigation was to determine the characteristics of the photoacoustic signal generated from the surface of a solid material. The important characteristics considered were the dependence of the signal upon: (1) the pump-laser power level, (2) the absorption coefficient and specific heat of the material, (3) the radial and axial sound distribution, and (4) the distribution of sound with laser focal characteristics. The model of peak sound pressure for the photoacoustic effect employed in this study was developed by Patel and Tam for liquids. The divergence angles of cylindrical and spherical sound waves were calculated by means of the lateral sound pressure distribution. Throughout the study the peak pressure of the photoacoustic sound pulse was measured through the use of the linear deflection of a HeNe probe beam. The results indicate that the Patel model for the peak pressure of a photoacoustic signal gives an adequate description of the dependence of the sound pressure upon radial distance and pump-laser power level. The results indicate that a cylindrical wave generated by titanium is optimum for applications to the measurement of flame temperatures. GRA

N85-27641# Yale Univ., New Haven, Conn. Dept. of Computer Science.
MULTIPLE ARRAY PROCESSORS FOR OCEAN ACOUSTIC

PROBLEMS
M. H. Schultz Feb. 1985 12 p
(Contract N00014-82-K-0184)
(AD-A152174; YALEU/DCS/RR-363) Avail: NTIS HC A02/MF A01 CSCL 20/1

The current revolution is computer hardware and architecture is having a major impact on many disciplines. In this paper we examine some of the implications of this revolution for some problems in computational underwater acoustics. In particular we consider the application of some model multi-array processor systems to the numerical solution of the three-dimensional parabolic approximation, for a discussion of parabolic approximations in underwater acoustics. Our goal is to illuminate some of the issues involved in taking advantage of the current advances in hardware technology to produce an extraordinarily fast, inexpensive, and, portable computer system for simulating underwater acoustic wave propagation. GRA

N85-27642# United Technologies Research Center, East Hartford, Conn.
RESEARCH AND DEVELOPMENT OF SUBSURFACE ACOUSTIC WAVE DEVICES FOR SENSOR APPLICATIONS Final Report, 30 Nov. 1983 - 31 Jan. 1985
D. E. Cullen and T. W. Grudkowski Jan. 1985 59 p
(Contract F49620-84-C-0006)
(AD-A152197; UTRC/R85-926671; AFOSR-85-0260TR) Avail: NTIS HC A04/MF A01 CSCL 20/1

Surface skimming bulk waves (SSBW) in quartz were examined for sensor applications. Sensitivities to substrate strains, temperature, and fluid immersion were determined for AT and BT-cut quartz. The application of a strain sensitive SSBW device configuration as a fluid damped, cantilever beam accelerometer was investigated. This program has resulted in the discovery of an SSAW mode with properties that are extremely well suited to the development of acoustic wave sensors. GRA

N85-27643# Pacific Northwest Lab., Richland, Wash.
ULTRASONIC DISPERSION OF SOILS FOR ROUTINE PARTICLE SIZE ANALYSIS: RECOMMENDED PROCEDURES
P. R. Heller, R. F. Hayden, and G. W. Gee Nov. 1984 19 p refs Presented at the Ann. Am. Soc. of Agronomy Meeting, Las Vegas, Nev., 25-30 Nov. 1984
(Contract DE-AC06-76RL-01830)
(DE85-005530; PNL-SA-12498; CONF-8411144-1) Avail: NTIS HC A02/MF A01

Ultrasonic techniques were found to be more effective than standard mechanical techniques to disperse soils for routine particle size analysis (i.e., using a dispersing agent and mechanical mixing). Soil samples were tested using an ultrasonic homogenizer at various power outputs. The samples varied widely in texture and mineralogy, and included sands, silts, clays, volcanic soils, and soils high in organic matter. A combination of chemical and ultrasonic disperson techniques were used in all tests. Hydrometer techniques were used for particle size analysis. For most materials tested, clay percentage values indicated that ultrasonic dispersion was more complete than mechanical dispersion. Soils high in volcanic ash or iron oxides showed 10 to 20 wt% more clay when using ultrasonic mixing rather than mechanical mixing. The recommended procedure requires ultrasonic dispersion of a 20-g to 40-g sample for 15 min at 300 W with a 1.9-cm-diameter ultrasonic homogenizer. DOE

N85-27644# Institut Franco-Allemand de Recherches, St. Louis (France).
MEASUREMENT OF COCHLEAR ACOUSTIC PRESSURE IN GUINEA PIGS [MESURES DE PRESSION ACOUSTIQUE INTRACOCHLEAIRE CHEZ LE COBAYE]
R. Franke and A. Dancer 18 Oct. 1983 27 p refs In FRENCH Presented at IUTAM/ICA Symp. on Mech. of Hearing, Delft, Jul. 1983
(ISL-CO-234/83) Avail: NTIS HC A03/MF A01

Guinea pig cochlear acoustic pressure was measured in the 3 to 200 Hz range. The cochlear microphonic potential was recorded. The experimental results agree with the Peterson and Bogert model. The pressure transducers and the calibrating device are confirmed to be excellent tools for this type of research. Author (ESA)

N85-27645# Institut Franco-Allemand de Recherches, St. Louis (France).
CONTRIBUTION TO THE STUDY OF EQUIVALENT NOISE SOURCE IDENTIFICATION IN FAST COLD JETS Ph.D. Thesis [CONTRIBUTION A L'ÈTUDE DE LA LOCALISATION DES SOURCES DE BRUIT EQUIVALENTES DANS DES JETS FROIDS RAPIDES]
M. Schaffar 3 Jun. 1983 237 p refs In FRENCH
(ISL-R-114/83) Avail: NTIS HC A11/MF A01

Noise sources were studied using three experimental methods based on the Lighthill acoustic analogy and on the decomposition of the source noise between shear noise and self noise. Utilizing the correlation velocity/acoustic pressure, simplifications are introduced in order to limit the velocity measurements. A laser velocimeter with Bragg cell is used. The results show that almost all the noise is justified by the integration of the experimental measurements. For < 46 deg angles the shear noise is $> 67\%$ of the measured noise. The self noise is 10% of total noise for Strouhal number < 0.54, and produced mainly in the mixing zone. Author (ESA)

N85-27646# Institut Franco-Allemand de Recherches, St. Louis (France).
ANALYSES OF ORDERLY STRUCTURES IN JETS AND THE RELATIONSHIP WITH EMITTED NOISE [ANALYSE DES STRUCTURES ORDONNEES DANS LES JETS ET RELATION AVEC LE BRUIT EMIS]
J. Haertig and H. Oertel 1 Aug. 1983 27 p refs In FRENCH
(Contract DRET-80/078)
(ISL-R-117/83) Avail: NTIS HC A03/MF A01

Excited subsonic and supersonic jets were studied using respectively a continuous jet and a shock tube to examine the regularity of the Mach waves, the structure of the acoustic field, and the aerodynamic characteristics of the flow in the pattern-containing regions. No differences in coherent structures are found between subsonic and supersonic jets. In the supersonic case the pressure field associated with the structures generates regular Mach waves which produce a dominant part of the noise. Author (ESA)

N85-27647# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
PREDICTION OF FREE-FIELD NOISE LEVELS FROM AIRCRAFT FLYOVER MEASUREMENTS
G. J. J. Ruijgrok May 1984 31 p refs
(VTH-LR-427) Avail: NTIS HC A03/MF A01

Results from a flight experiment on a light propeller-driven aircraft were used to examine the ability to correct flyover noise spectra to free-field conditions. Flyover noise was measured when the aircraft was overhead. Average direct measurement spectra were obtained at a measuring station comprising a microphone placed at a height of 1.2 m over grassland and a microphone laid on a metal plate at ground level. Both measurement spectra were corrected for ground interference effects to yield the free-field noise characteristics. The theoretical model used for the prediction of the effects of ground reflection on aircraft noise recorded above a partly reflecting ground surface is presented. Comparison of corrected noise spectra from the two receiver positions demonstrates the potential to accurately deduce free-field noise levels from acoustic data measured by a single microphone arrangement. Author (ESA)

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N85-27648# Oregon Univ., Eugene.
THEORY OF ELECTRON-IMPACT ATOMIC IONIZATION CROSS

SECTIONS Annual Summary Report, 1 Jul. 1984 - 30 Jun. 1985
M. D. Girardeau Mar. 1985 8 p
(Contract N00014-81-K-0759)
(AD-A151763) Avail: NTIS HC A02/MF A01 CSCL 20/8

The research underway is concerned with both the general theory and detailed calculations of differential cross sections for charge exchange and electron impact ionization occurring in collisions of simple atomic, ionic, and molecular species. GRA

N85-27649# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
INVESTIGATION OF ELECTRON ATTACHMENT AND DISSOCIATION RATES IN C2F6/CH4 ELECTRIC GAS DISCHARGES M.S. Thesis
V. R. Wilson Dec. 1984 106 p
(AD-A151796; AFIT/GEO/PH/84D-5) Avail: NTIS HC A06/MF A01 CSCL 20/8

This investigation determined the attachment and dissociation rates of the electronegative gas, C2F6, in a buffer gas of methane, Ch4, at atmospheric pressure when undergoing electron-beam sustained gas discharges. A non-linear least-squares fit of the electron lifetime equation to the decay portion of the discharge current pulse indicates an attachment rate of 500,000/sec for a gas mixture ratio of 1/7550, C2F6/CH4 and an E/N range of 3 to 13 Townsend. Results of the curve fit were inconclusive for E/N below 3 Townsend due to the effects of a slowly decaying electron-beam. Attempts were made to measure the dissociation rate of C2F6 as a function of discharge time for a ratio of E/N equal to 13 Townsend using a residual gas analyzer. The actual dissociation rate was not determined. However, it was confirmed that the dissociation of C2F6 due to the electron-beam ionization pulses and the corresponding gas discharge was not significant in large closed-cycle gas flow loops as proposed for pulsed power switching if E/N is held below 13 Townsend. GRA

N85-27650# Wisconsin Univ., Madison. Dept. of Chemistry.
ROTATIONAL ENERGY TRANSFER IN HIGHLY VIBRATIONALLY EXCITED HYDROGEN FLUORIDE AND DEUTERIUM FLUORIDE Summary Report, Jun. 1984 - May 1985
F. F. Crim 8 Mar. 1985 12 p
(Contract N00014-79-C-0415; DA Proj. RR0-1103)
(AD-A152003) Avail: NTIS HC A02/MF A01 CSCL 20/8

Overtone vibration-laser double resonance measurements have provided new data on vibrational and rotational relaxation in HF(v=2). These experiments determine the magnitudes of the total vibrational relaxation rate constants for HF (v=1 and 2) as well as their temperature dependences. Detailed analysis yields the variation of the branching between competing V-V and V-TR pathways. Rotational relaxation data come from these measurements as well. The temporal evolution of individual rotational states observed in the double resonance studies provides level-to-level energy transfer rate constants when analyzed using an iterative fitting scheme which incorporates scaling relations among the rate constants. GRA

N85-27651# Research Inst. of Colorado, Fort Collins.
HIGH EFFICIENCY TRANSVERSE dc ELECTRON BEAMS Final Scientific Report, 1 Aug. 1983 - 31 Jul. 1984
G. Collins Oct. 1984 57 p
(Grant AF-AFOSR-0267-83)
(AD-A152038; RIC-247; AFOSR-85-0242TR) Avail: NTIS HC A04/MF A01 CSCL 20/7

The proposed new sintered metal oxide-metal (e.g., Al2O3-Mo) cathodes were tested. As originally predicted these cathode materials produce high current beams (1A) at multikilowatt posers in atmospheres containing a pure novel gas or a mixture of a novel gas and a metal vapor at generation efficiencies up to 75%. In contrast with other cathode materials previously used, the sintered materials allow multikilowatt electron beam operation in an oxygen free atmosphere. This is an important development in the construction of an CW electron beam excited UV laser, where no oxygen can be tolerated. These new electron guns developed for laser excitation find also important applications in other areas of research, such as the processing of microelectronic materials. GRA

N85-27652# Tennessee Univ., Knoxville. Dept. of Physics and Astronomy.
NUCLEAR SPECTROSCOPIC STUDIES Progress Report, 1 Jun. 1984 - 31 May 1985
C. R. Bingham, M. W. Guidry, and L. L. Riedinger 1 Feb. 1985 107 p refs
(Contract DE-AS05-76ER-04936)
(DE85-006894; DOE/ER-04936/10) Avail: NTIS HC A06/MF A01

Significant advances were made in the: (1) study of the low-energy properties of nuclei far from stability; (2) use of the spin spectrometer and internal avalanche detectors to sort out greater details of direct reactions between heavy ions; and (3) understanding the structure of deformed and transitional nuclei at high angular momentum and feeding patterns of the high-spin yrast levels. Theoretical work included application of the cranked shell model to understanding structure at high angular momentum, description of the general features of spectra observed for single-nucleon transfer between heavy ions, and application of dynamical symmetries in a fermion space to deduce a general description of nuclear structure over a broad range of states and behavior. DOE

N85-27653# Argonne National Lab., Ill. Physics Div.
PROCEEDINGS OF THE WORKSHOP ON POLARIZED TARGETS IN STORAGE RINGS
R. J. Holt, ed. Aug. 1984 400 p refs Workshop held in Argonne, Ill., 17-18 May 1984
(Contract W-31-109-eng-38)
(DE85-002704; ANL-84-50; CONF-8405113) Avail: NTIS HC A17/MF A01

Polarization phenomena have played an increasingly important part in the study of nuclei and nucleons in recent years. Polarization studies have been hampered by the relatively few and rather fragile polarized targets which are presently available. The concept of polarized gas targets in storage rings opens a much wider range of possibilities than is available in the external target geometry. This method will represent a considerable advance in nuclear physics and will continue to receive much attention in plans for future facilities. The workshop drew together a unique group of physicists in the fields of high-energy, nuclear and atomic physics. The meeting was organized in a manner that simulated discussion among the 58 participants and focused on developments in polarized target technology and the underlying atomic physics. An impressive array of future possibilities for polarized targets as well as current developments in polarized target technology were discussed at the workshop. DOE

N85-27654# Los Alamos Scientific Lab., N. Mex.
ENERGY DEPOSITION FROM PARTICLE BEAMS
W. Zack Osborne Nov. 1984 28 p refs
(Contract W-7405-eng-36)
(DE85-007382; IA-9683-MS) Avail: NTIS HC A03/MF A01

A FORTRAN code named PARTEN, designed to compute electron or heavy-particle energy deposition in a layered, infinite plane target, was written and tested by comparison with measurements. Ease of use, transportability, and economy in computing times were primary considerations. The user may choose to include or omit energy loss straggling and multiple scattering detours. The user also has the optics of including a treatment of the photon electron multiplication and transport process for ion beams. DOE

N85-27655# Fermi National Accelerator Lab., Batavia, Ill.
DISTORTION FUNCTIONS
T. L. Collins 23 Oct. 1984 46 p
(Contract DE-AC03-76SF-00515)

(DE85-007511; FNAL-84/114) Avail: NTIS HC A03/MF A01

Distortion functions are described which are a new form of solution to the old problem of describing the non-linear beam shape that repeats. They have an exact formal similarity to the usual orbit distortion calculation, and therefore have the nice property that a modest arithmetic effort will yield a precise value at one point in the ring and twice that effort will give values at all points. This latter property permits an easy evaluation of the second-order tune shift from sextupoles - both types - which is very important. The distortion is expanded in orders which here means the power of the multipole. The first order does describe most of the distortion for marginally acceptable beams. Higher order effects do appear as small, closed resonances but there is often not much distinction between second and still higher orders. In any case the nature of the expansion (and the examples) makes clear that small first order is a necessary and sufficient condition for good beams.DOE

N85-27656# California Univ., Livermore. Lawrence Livermore Lab.

TRANSVERSE PERIODIC BOUNDARY CONDITIONS IN MOLECULAR DYNAMICS WITH UNIAXIAL STRAIN SHOCK WAVES

P. Harris and A. M. Karo 20 Nov. 1984 10 p refs

(Contract W-7405-eng-48)

(DE85-006497; UCRL-53599) Avail: NTIS HC A02/MF A01

The role of transverse, periodic, boundary conditions (TPBCs) in multidimensional molecular dynamics (MD) calculations are discussed. It is concluded that observed nonsteady-state shock propagation in MD calculations could easily be an artifact resulting from inadequate separation between the periodic boundaries.

E.A.K.

N85-27657# California Univ., Livermore. Lawrence Livermore Lab.

HYDROGEN VIBRATIONAL POPULATION DISTRIBUTIONS AND NEGATIVE ION GENERATION IN TANDEM HIGH-DENSITY HYDROGEN DISCHARGES

J. R. Hiskes, A. M. Karo, and P. A. Willmann 3 Dec. 1984 30 p refs Presented at the 31st Natl. Vacuum Symp., Reno, Nev., 4-7 Dec. 1984 Prepared for publication

(Contract W-7405-eng-48)

(DE85-006764; UCRL-90951-Rev-1; CONF-841218-3-Rev-1) Avail: NTIS HC A03/MF A01

The tandem high density hydrogen negative ion source system is optimized to identify the largest possible ion concentrations and extracted ion currents. The optimization includes varying the length of the second chamber, neutral gas and electron densities, and the ratio of atomic to molecular density. Vibrational excitation occurs via high energy electron excitation (E-V process) and H2(+) surface neutralization (s-V process). These processes are considered separately and acting in parallel. The solutions are presented in terms of a dimensional scale factor, R. For a system scale length R = 1 cm, optimum extracted current densities are in the range 50 to 100 mA cm(-2). A single chamber s-V system with the high energy electron component suppressed can provide larger ion concentrations than a tandem E-V, s-V system. DOE

N85-27658# Oak Ridge National Lab., Tenn. Atomic Theory Group.

SURVEY OF EXPERIMENTAL AND THEORETICAL ELECTRON-IMPACT IONIZATION CROSS SECTIONS FOR TRANSITION METAL IONS IN LOW STAGES OF IONIZATION

M. S. Pindzola, D. C. Griffin, C. Bottcher, D. C. Gregory, A. M. Howald, R. A. Phaneuf, D. H. Crandall, G. H. Dunn (Colorado Univ., Boulder), D. W. Mueller (Colorado Univ., Boulder), and T. J. Morgan (Colorado Univ., Boulder) Mar. 1985 64 p refs

(Contract DE-AC05-84OR-21400)

(DE85-007605; ORNL/TM-9436) Avail: NTIS HC A04/MF A01

Electron ion crossed beams measurements and distorted wave theory have been employed to make a study of electron impact ionization for transition metal ions in low stages of ionization. The atomic ions Ti+, Ti(2)+, Ti(3)+, Fe+, Fe(2)+, Fe(3)+, Fe(4)+, Ni+, Ni(2)+, Ni(3)+, Cu+, Cu(2)+, and Cu(3)+ are examined. DOE

N85-27659# Brookhaven National Lab., Upton, N. Y. Intermediate Energy Group.

A 1-2 GeV/c BEAM LINE FOR HYPERNUCLEAR AND KAON RESEARCH

R. E. Chrien 15 Feb. 1985 94 p refs

(Contract DE-AC02-76CH-00016)

(DE85-007623; BNL-36082) Avail: NTIS HC A05/MF A01

A kaon beam line operating in the range from 1.0 to 2.9 GeV/c is proposed. The line is meant for kaon and pion research in a region hitherto inaccessible to experimenters. Topics in hypernuclear and kaon physics of high current interest include the investigation of doubly strange nuclear systems with the K(-), K(+) reaction, searching for dibaryon resonances, hyperon-nucleon interactions, hypernuclear (GAMMA) rays, and associated production of excited hypernuclei. The beam line would provide separated beams of momentum analyzed kaons at intensities greater than a million per spill with a momentum determined to one part in a thousand. This intensity is an order of magnitude greater than that currently available. DOE

N85-27660# Tennessee Univ., Knoxville. Dept. of Physics.

BOSON DEGREES OF FREEDOM IN FERMION MANY-BODY SYSTEMS

M. W. Guidry, C. L. Wu (Jilin Univ.), and D. H. Feng (Drexel Univ.) 1984 14 p refs Presented at the Intern. Workshop on Interacting Boson-Boson and Boson-Fermion Systems, Gull Lake, Mich., 28-30 May 1984

(Contract DE-AS05-76ER-04936)

(DE85-006997; CONF-8405231-10) Avail: NTIS HC A02/MF A01

The application of the composite particle representation and boson Fermion hybrid representation to boson behavior in fermion systems is discussed. The quantitative understanding of the number of many body Fermi systems which exhibit base behavior and the interaction of the base and Fermi degrees of freedom is examined. DOE

N85-27661# California Univ., Berkeley. Lawrence Berkeley Lab.

MICROSCOPIC ANALYSIS OF ANGULAR MOMENTUM PROJECTED HFB-STATES IN TERMS OF INTERACTING BOSONS

P. Ring and W. Pannert (Technische Univ., Munich, Garching) Dec. 1984 12 p refs Presented at the Intern. Symp. on Nucl. Shell Model, Philadelphia, 31 Oct. 1984

(Contract DE-AC03-76SF-00098)

(DE85-007629; LBL-18846; CONF-8410144-8) Avail: NTIS HC A02/MF A01

Angular momentum- and number-projected Hartree-Fock-Bogolliubov (HFB) wavefunctions for transitional and deformed Rare Earth nuclei are analyzed in terms of Fermion pairs coupled to angular momenta L = 0(S), 2(D), 4(G), ... The Fermion space is truncated to contain only S-D or S-D-G pairs. The variation is carried out before and after angular momentum projection and with different truncations. The influence of the truncation on physical quantities such as moments of inertia, quadrupole moments or pair transfer matrix elements is discussed. DOE

N85-27662# Max-Planck-Inst. fuer Plasmaphysik, Garching (West Germany).

ENERGY REFLECTION COEFFICIENT FOR H+ IONS AT ENERGIES BETWEEN 10 AND 80 keV

C. K. Chen (Academia Sinica, Peking), J. Bohdansky, W. Eckstein, and M. T. Robinson (ORNL) Apr. 1984 15 p refs Presented at the 6th Intern. Conf. on Plasma Surface Interactions in Controlled Fusion Devices, Nagoya, Japan, 14-18 May 1984 Submitted for publication

(Contracts DE-AC05-84OR-21400; W-7405-eng-26)

(DE85-007547; CONF-840520-29) Avail: NTIS HC A02/MF A01

The energy reflection coefficient for H(+) ions at energies between 10 keV and 80 keV was determined by experiments and by computer calculations. Measurements were made with graphite,

Al, Cu, Mo and W, targets. The angle of ion incidence was restricted to 85, 78 and 70 deg. measured from the surface normal. Calculated data were obtained by two different Monte Carlo computer programs (MARLOWE, TRIM). It was found that both the calculated and the measured data scale with the parameter epsilon cos(2) (ALPHA), where epsilon is Lindhard's reduced energy and (ALPHA) the angle of incidence for the ions. The measured values are smaller than those calculated. This can be explained by surface roughness which developed during the ion irradiation. DOE

N85-27663# Argonne National Lab., Ill.
REFINEMENTS IN THE COMPUTATION OF COLLISION PROBABILITIES
E. M. Gelbard 1985 12 p refs Presented at the Intern. Meeting on Advan. in Nucl. Eng. Computational Methods, Knoxville, Tenn., 9 Apr. 1985
(Contract W-31-109-eng-38)
(DE85-006118; CONF-850411-8) Avail: NTIS HC A02/MF A01

Generally collision probabilities, P/sub ij/, are computed by the Carlvik method using equally spaced azimuthal angles, and the P/sub ii/'s are adjusted so that the probabilities sum to unity. It will be shown that for many XY cells efficiency can be substantially improved through use of double Gauss azimuthal angles, and through an alternative adjustment procedure. DOE

N85-27664# Los Alamos Scientific Lab., N. Mex.
SURVEYING AND OPTICAL TOOLING TECHNOLOGIES COMBINED TO ALIGN A SKEWED BEAMLINE AT THE LAMPF ACCELERATOR
Walter Bauke, David Clark, and Peter B. Trujillo 1985 11 p Presented at the ASP-ACSM Conv., Washington, D.C., 10-15 Mar. 1985
(Contract W-7405-eng-36)
(DE85-005902; LA-UR-85-61; CONF-8503104-1) Avail: NTIS HC A02/MF A01

Optical tooling evolved from traditional surveying, and both technologies are sometimes used interchangeably in large industrial installations, since the instruments and their specialized adapters and supports complement each other well. A unique marriage of both technologies was accomplished in a novel application at LAMPF, the Los Alamos Meson Physics Facility. LAMPF consists of a linear accelerator with multiple target systems, one of which had to be altered to accommodate a new beamline for a neutrino experiment. The new line was to be installed into a crowded beam tunnel and had to be skewed and tilted in compound angles to avoid existing equipment. Optical tooling was used in conjunction with simple alignment and reference fixtures to set fiducials on the magnets and other mechanical components of the beamline, and how theodolites and sight levels were then adapted to align these components along the calculated skew planes. Design tolerances are compared with measured alignment results. Author

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N85-27665*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TABLES OF NUCLEAR CROSS SECTIONS FOR GALACTIC COSMIC RAYS: ABSORPTION CROSS SECTIONS
Lawrence W. Townsend and John W. Wilson May 1985 33 p refs
(NASA-RP-1134; L-15891; NAS 1.61:1134) Avail: NTIS HC A03/MF A01 CSCL 03B

A simple but comprehensive theory of nuclear reactions is presented. Extensive tables of nucleon, deuteron, and heavy-ion absorption cross sections over a broad range of energies are generated for use in cosmic ray shielding studies. Numerous comparisons of the calculated values with available experimental data show agreement to within 3 percent for energies above 80 MeV/nucleon and within approximately 10 percent for energies as low as 30 MeV/nucleon. These tables represent the culmination of the development of the absorption cross section formalism and supersede the preliminary absorption cross sections published previously in NASA TN D-8107, NASA TP-2138, and NASA TM-84636. Author

N85-27666# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A PORTABLE PULSE ANALYZER FOR NUCLEAR GEOPHYSICS USING A SINCLAIR-TK MICROCOMPUTER [UM ANALISADOR PORTATIL DE PULSOS PARA GEOFISICA NUCLEAR USANDO O MICROCOMPUTADOR DA LINHA SINCLAIR-TK]
D. J. R. Nordemann, A. M. Takashima, and S. L. MantelliNeto Sep. 1984 8 p In PORTUGUESE Presented at the 36th Ann. Meeting of SBPC, Sao Paulo, Brazil, Jul. 1984
(INPE-3278-PRE/601) Avail: NTIS HC A02/MF A01

A portable pulse analyzer is described that uses an ADC 0816 converter, a Sinclair-TK microcomputer, and a portable television. The analyzer provides reasonable linearity and is inexpensive. A simplified scheme for a portable pulse analyzer shows a pulse stretcher, discriminator, 8-bit analogical digital converter, and interfacing circuit leading to the microcomputer. Author

N85-27667# Harvard Univ., Cambridge, Mass.
SPIN-POLARIZED QUANTUM SYSTEMS Final Report
I. F. Silvera 1984 7 p refs
(Contract DE-AC02-83ER-45007)
(DE85-006914; DOE/ER-45007/1) Avail: NTIS HC A02/MF A01

Research activities are reported. The main goals were to increase the density of spin polarized atomic hydrogen to the 10 to the 18th power to 10 to the 19th power/cu cm region, where at low temperatures Bose-Einstein condensation (BEC) may be observed, and to develop the ESR technique for studying spin polarized hydrogen. In addition, the life trajectory of a gas of spin polarized hydrogen to the molecular state was studied. Ideas emerging could significantly influence experiments for obtaining BEC. DOE

N85-27668# Technical Research Centre of Finland, Espoo. Electrical Engineering Lab.
INFORMATION PRESENTATION IN POWER PLANT CONTROL ROOMS
Ari Kautto Nov. 1984 126 p refs Sponsored by Imatran Voima Oy, OECD, Halden Reactor Project, and Combustion Engineering Inc.
(VTT-320; ISBN-951-38-2167-6; ISSN-0358-5077) Avail: NTIS HC A07/MF A01

The organization and presentation of information in a pressurized water reactor control room is discussed. Design of the alert function so as to reduce the number of alarms during plant shutdown, e.g., during the refuelling or maintenance period and during a disturbance, is considered. Validation of the Critical Function Monitoring System on a training simulator is described. Functional decomposition of information is shown to be helpful in designing displays. Criteria for designing displays, the structure of the information presentation system, and the main interactions are presented. Author (ESA)

74 OPTICS

Includes light phenomena.

N85-27669*# California Univ., Los Angeles. Dept. of Electrical Engineering.
A STUDY OF TOPOLOGIES AND PROTOCOLS FOR FIBER OPTIC LOCAL AREA NETWORK Final Technical Report
C. Yeh, M. Gerla, and P. Rodrigues Jan. 1985 223 p refs

Prepared for JPL
(Contract JPL-956656)
(NASA-CR-175771; JPL-9950-1097; NAS 1.26:175771) Avail: NTIS HC A10/MF A01 CSCL 20F

The emergence of new applications requiring high data traffic necessitates the development of high speed local area networks. Optical fiber is selected as the transmission medium due to its inherent advantages over other possible media and the dual optical bus architecture is shown to be the most suitable topology. Asynchronous access protocols, including token, random, hybrid random/token, and virtual token schemes, are developed and analyzed. Exact expressions for insertion delay and utilization at light and heavy load are derived, and intermediate load behavior is investigated by simulation. A new tokenless adaptive scheme whose control depends only on the detection of activity on the channel is shown to outperform round-robin schemes under uneven loads and multipacket traffic and to perform optimally at light load. An approximate solution to the queueing delay for an oscillating polling scheme under chaining is obtained and results are compared with simulation. Solutions to the problem of building systems with a large number of stations are presented, including maximization of the number of optical couplers, and the use of passive star/bus topologies, bridges and gateways. Author

N85-27670# Illinois Univ., Chicago. Dept. of Physics.
STUDIES OF COLLISIONAL AND NONLINEAR RADIATIVE PROCESS FOR DEVELOPMENT OF COHERENT UV AND XUV SOURCES Final Report, Nov. 1983 - Nov. 1984
C. K. Rhodes, H. Pummer, and H. Egger Nov. 1984 116 p
(Grant AF-AFOSR-0280-82)
(AD-A152001; AFOSR-85-0253TR) Avail: NTIS HC A06/MF A01 CSCL 20/8

The availability of recently developed high brightness picosecond rare gas halogen sources permits the performance of a broad range of basic physical studies of high-lying electronic states of atomic and molecular materials. Moreover, the extension of the ultraviolet source technology to the femtosecond range will enable the generation of extreme physical environments, namely, coherent irradiation with an electric field amplitude, that are impossible to establish by any other known means. Experiments conducted over the past year indicate that it may be feasible to examine the detailed properties of states in a wide variety of systems in the region above 100 eV, and even possibly into the 1000 range of excitation, with these new experimental tools. The excited configurations of principal interest are those coupled to adjacent continua, prominent members of which are multiply excited and core excited states. The nature of intra-atomic interactions, including collective motions, figures naturally and importantly in this topic. GRA

N85-27671# Naval Ocean Systems Center, San Diego, Calif.
TEST OF LIDAR INVERSION ALGORITHM SENSITIVITY TO ATMOSPHERIC BACKSCATTER AND EXTINCTION PARAMETERS, REVISION A Final Report, Jul. - Sep. 1984
M. R. Paulson Jan. 1985 22 p
(F59-551)
(AD-A152082; NOSC/TD-764-REV-A) Avail: NTIS HC A02/MF A01 CSCL 20/6

The performance of a lidar inversion algorithm has been investigated to determine its sensitivity to errors in the relationship between the extinction coefficient and the backscatter coefficient. Data were generated with known extinction coefficients and known backscatter coefficients, C2 and k, for several atmospheric models. These data were used with the inversion algorithm, and sub C2 and k were varied separately to see what errors would be produced in the visibilities calculated by the algorithm. For atmospheric conditions which produced visibilities around 4 kilometers, errors in C2 of as little as plus or minus 5% percent could produce errors in visibility from 50% too large to 100% too small, or zero visibility. GRA

N85-27672# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DARPA/TTO PROGRAM IR BINARY OPTICS Semiannual Technical Summary, 1 Jan. - 30 Jun. 1984
W. B. Veldkamp 30 Jun. 1984 8 p
(Contract F19628-85-C-0002; ARPA Order 4654)
(AD-A152196; ESD-TR-84-285) Avail: NTIS HC A02/MF A01 CSCL 20/6

Binary grating optics consist of microfine rectangular (high-low) relief patterns on a dielectric or a metallic surface. By controlling the depth, width and periodicity of the binary pattern, the amplitude and the phase of an electromagnetic wave can be controlled to produce a variety of optical transfer functions. The lithographic tools for fabrication of binary optics are the ones developed for VLSI circuit fabrication. From a single lithographic mask, planar replica optics can be made in quantity. This technology has broad applicability for tactical missile systems as well as for space systems. In addition to making optics cheaper than by conventional means, binary optics allows the fabrication of unique devices that cannot be made conventionally. These include high-speed rotary scanners, multiplexers, filters, beam shapers and coherent laser adders. The goal of this program is the development of high quality planar optical components using VLSI circuit fabrication techniques. The main elements of the plan are: (1) the development of large aperture segmented and piezoelectrically active planar optical surfaces, (2) the development of raster scanning laser telescopes and extension to broadband applications, and (3) the application of diffractive optics technology to the coherent addition of beams from modular laser systems. This report covers progress in the setup of a reactive ion-beam etching laboratory, and the feasibility demonstrations of the coherent beam addition concept with gas lasers. GRA

N85-27673# California Univ., Livermore. Lawrence Livermore Lab.
LIGHT: A RAY TRACING CODE TO SIMULATE LIGHT COLLECTION IN SCINTILLATION SPECTROMETERS AND LIGHT PIPES
D. Slaughter Jan. 1985 55 p refs
(Contract W-7405-eng-48)
(DE85-007213; UCID-20334) Avail: NTIS HC A04/MF A01

Light originating along a line or throughout a volumetric source is simulated by Monte-Carlo ray tracing. Up to ten axially symmetric zones with wavelength dependent indices of refraction, attenuation, and reflection may be constructed from truncated cones sharing a common axis. Polarization effects are not included. Reflectors may be specular or deffuse, their properties may be distinct in various annular zones on the planes separating the problem zones, and the wavelength may be changed upon reflection. The code, which runs on the CDC 7600 and CRAY computers provides graphics displays of the spatial and wavelength distribution of light reaching either end of the geometry as well as the distribution function of light amplitudes collected from a large number of randomly oriented sources so that spectrometer pulse height distributions are simulated. DOE

N85-27674# Institut Franco-Allemand de Recherches, St. Louis (France).
FORMULATION OF A COHERENT LIGHT-SHEET BY MEANS OF A CYLINDRICAL-SPHERICAL OPTICAL SYSTEM [FORMATION D'UNE NAPPE LUMINEUSE COHERENTE A L'AIDE D'UN SYSTEME OPTIQUE SPHERO-CYLINDRIQUE]
J. Saulnier 8 Jul. 1983 62 p refs In FRENCH
(Contract DRET-81/626)
(ISL-R-116/83) Avail: NTIS HC A04/MF A01

Different ways to obtain a light sheet from a laser beam are studied, using devices employed in laser Doppler velocimetry to study a narrow section of fluid flow. The main properties of Gaussian beams, the Kogelnik relationships, are recalled. Several assemblies are examined. The results are utilized to formulate two computer programs for fast design of light sheet systems. Author (ESA)

N85-27054# Joint Publications Research Service, Arlington, Va.
MIRROR ACCESSORY FOR LINE STRAIGHTENING IN DIFFRACTION SPECTROMETERS Abstract Only

V. M. Kelman and I. V. Rodnikova *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-006) 6 Aug. 1984 p 48 refs Transl. into ENGLISH from Izv. Akad. Nauk Kaz. SSR, Ser. Fiz.-Mat. (Alma-ATA, USSR), no. 6, Jun. 1984 p 76-79 (For primary document see N85-27035 16-31)
Avail: NTIS HC A05/MF A01

N85-27305# Joint Publications Research Service, Arlington, Va.
NEW IMAGE DEBLURRING METHOD DESCRIBED
Y. Guoguang and E. N. Leith *In its* China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 87-97 refs Transl. into ENGLISH from Guangxue Xuebao (Shanghai), no. 1, 1983 p 1-9 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N85-27675# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
COMMENTS ON THE PAPER BY F. PEGORARO, L. SUGIYAMA: SPATIAL DIFFUSION OF CHARGED HIGH-ENERGY FUSION PRODUCTS BY SHEAR ALFVEN PERTURBATIONS
Antonio Carlos deAlmeidFerreira Sep. 1984 26 p refs Submitted for publication
(INPE-3291-PRE/606) Avail: NTIS HC A03/MF A01

A discussion of the MHD spectrum of low frequency, high toroidal number modes based on an averaged equation is presented. It is shown that the stable spectrum of shear Alfven waves and slow magnetoacoustic waves can be obtained from the asymptotic solutions of the general ballooning equations. A local stability criterion for ballooning modes is given. The radial structure of the modes is determined. The validity of different equilibrium models to reproduce pressure gradient driven instabilities is discussed. By means of an effective potential, the main features of the propagation of shear Alfven perturbations in toroidal configurations are identified. Author

N85-27676# Nagoya Univ. (Japan). Inst. of Plasma Physics.
BALLOONING BETA LIMITS OF DEE AND BEAN SHAPED TOKAMAKS
K. Yamazaki, T. Amano, H. Naitou, Y. Hamada, and M. Azumi Feb. 1985 47 p refs
(IPPJ-713) Avail: NTIS HC A03/MF A01

Numerical studies of the first stability beta-limit due to n = infinity ballooning modes in advanced shaped Tokamaks are carried out. A higher beta value than the present conventional beta scaling is expected for advanced shaped Tokamaks with sufficient triangularity - indentation. The extremely elongated configuration without appropriate triangularity does not lead to the increase of the critical beta. Dee or bean shaping with sharp tip cross-section is more favorable for achieving high beta value than that with round tip cross-section having the nearly same safety factor profile. A new beta scaling for elongated ellipse, dee and bean shaped Tokamaks is derived. M.G.

N85-27677# Nagoya Univ. (Japan). Inst. of Plasma Physics.
POLOIDAL ROTATION OF MAGNETIC FLUCTUATIONS IN REVERSED FIELD PINCH PLASMA
A. Nagata (Hiroshima Univ.), H. Arimoto, S. Masamune (Kyoto Inst. of Tech.), K. Ogawa (Electrotechnical Lab., Ibaraki, Japan), S. Yamada, A. Matsuoka (Gunma Univ.), H. Sindo (Hiroshima Univ.), H. Oshiyama (Kyoto Inst. of Tech.), K. Tamaru (Hiroshima Univ.), and K. I. Sato Feb. 1985 17 p refs
(IPPJ-715) Avail: NTIS HC A02/MF A01

In reversed field pinch (RFP), the poloidal rotation of magnetic fluctuations with m = 1, absolute value of N = 5 to 12, where m and n are poloidal and toroidal mode numbers, is observed by measurements of magnetic probes and streak photographs. The rotation starts immediately after the RFP configuration set up and the rotation frequency increases as the RFP configuration evolves. In the quiescent period, the rotation frequency is kept almost constant. Its value is about 100 kHz. In the final phase of the quiescent period, however, the rotation is accelerated again. M.G.

N85-27678# Nagoya Univ. (Japan). Inst. of Plasma Physics.
MAGNETOHYDRODYNAMIC STABILITY OF SPHEROMAK PLASMA IN TOROIDAL FLUX CONSERVER WITH RECTANGULAR CROSS SECTION
Masayoshi Taguchi (Tokyo Univ.), Takeshi Miyazaki (Hitachi Ltd., Tokyo, Japan), and Shobu Kaneko (Tokyo Univ.) Feb. 1985 17 p refs
(IPPJ-716) Avail: NTIS HC A02/MF A01

The stability of axially symmetric force-free equilibrium plasmas is investigated. As a model of the flux conserver, a toroidal vessel with a rectangular cross section is considered. The radii of the inner and the outer walls of the vessel are denoted by R(i) and R, and the height h. The plasma is shown to be stable for the ideal magnetohydrodynamic perturbations when $h/R < (h/R)^*$, and unstable when $R(i)/R < 0.11$ and $(h/R)^* < (h/R) < (h/R)(+)$. The values of the critical ratios $(h/R)^*$ and $(h/R(+)$ are evaluated as a function of R(i)/R. M.G.

N85-27679# Nagoya Univ. (Japan). Inst. of Plasma Physics.
HIGH ENERGY PARTICLE ACCELERATION BY COHERENT ELECTROMAGNETIC WAVES PROPAGATING ACROSS THE MAGNETIC FIELD
Y. Nishida and R. Sugihara Feb. 1985 15 p refs
(IPPJ-717) Avail: NTIS HC A02/MF A01

Schemes are proposed for obtaining effective interaction between coherent electromagnetic waves and free electrons, both traveling across the magnetic field. These schemes use the principle of the V sub p x B acceleration of electrons originally observed in the plasma. Potential applications of the schemes are optical particle accelerators without using plasma. Author

N85-27680# Nagoya Univ. (Japan). Inst. of Plasma Physics.
TOKASTAR: A TOKAMAK STELLARATOR HYBRID WITH POSSIBLE BEAN-SHAPED OPERATION
K. Yamazaki and Y. Abe Feb. 1985 25 p refs
(IPPJ-718) Avail: NTIS HC A02/MF A01

A high-beta configuration of low-aspect-ratio Tokamak-stellarator hybrid (named TOKASTAR) with a dee- or bean- shaped cross-section is proposed, which is produced by the application of the outer semi-helical field to the advanced shaped Tokamak plasma. In this configuration, the magnetic local shear near the bad-curvature region of the Tokamak plasma is enhanced by the outer helical field without sufficient change in the average shear. A bean-shaped operation of pure-Tokamak, pure-helical or hybrid configuration is possible in this system. A steady-state high-beta configuration stable to the ballooning mode may be realized by this TOKASTAR concept. M.G.

N85-27681# Nagoya Univ. (Japan). Inst. of Plasma Physics.
VELOCITY SPACE DIFFUSION OF HIGH ENERGY IONS INDUCED BY A LOWER HYBRID WAVE IN A NONUNIFORM MAGNETIC FIELD
Shoji Tanaka, Ryo Sugihara, Shuichi Takamura, and Takayoshi Okuda Jan. 1985 25 p refs
(IPPJ-714) Avail: NTIS HC A02/MF A01

For the evaluation of the velocity diffusion, a set of difference equations is derived which describes the motion of an ion interacting with an externally excited lower hybrid wave in a nonuniform magnetic field. In addition to the well-known cyclotron harmonic resonance, the formula includes a phase shift of a wave-particle interaction. The latter enhances the diffusion of ions in velocity space. The frequency shift due to the guiding-center drift is also included. It can govern the velocity diffusion when the particle energy is high. A numerical calculation for an example is presented to show how the velocity diffusion is enhanced. M.G.

N85-27682# Los Alamos Scientific Lab., N. Mex.
OPTIMIZING COMPUTATIONAL EFFICIENCY AND USER CONVENIENCE IN PLASMA SIMULATION CODES
Christopher W. Barnes 1985 8 p Presented at the 2nd Intern. School for Space Simulation, Honolulu, Hawaii, 3-16 Feb. 1985
(Contract W-7405-eng-36)
(DE85-007661; LA-UR-85-523; CONF-850266-1) Avail: NTIS HC A02/MF A01

It is usually important to write plasma simulation codes in such a way that they execute efficiently and are convenient to use. Practical techniques to achieve this goal are discussed. Numerical algorithms must be well formulated and advantage taken of machine architecture in casting the algorithm into a high level language such as FORTRAN. The advantages of writing critical routines in Assembler are discussed. For large simulation codes, disks must often be used as a temporary store for working data. Efficient methods for doing this are presented. Codes must not only be well organized for ease of implementation and maintenance, but also for ease of use. Ways are suggested for packaging codes such that setup, batch production, restarting and diagnostic postprocessing is facilitated. Particular emphasis is placed on graphics postprocessors, since they must be used in real time with graphics terminals as well as with hardcopy devices. DOE

N85-27683# Los Alamos Scientific Lab., N. Mex.
FUNDAMENTALS OF PLASMA SIMULATION
David W. Forslund 1985 15 p refs Presented at the 2nd Intern. School for Space Simulation, Honolulu, Hawaii, 3-16 Feb. 1985
(Contract W-7405-eng-36)
(DE85-007699; LA-UR-85-413; CONF-850266-2) Avail: NTIS HC A02/MF A01

With the increasing size and speed of modern computers, the incredibly complex nonlinear properties of plasmas in the laboratory and in space are being successfully explored in increasing depth. Of particular importance have been numerical simulation techniques involving finite size particles on a dicrete mesh. After dicussing the importance of this, means of understanding a variety of nonlinear plasma phenomena, the basic elements of particle-in-cell simulation and their limitations and advantages are discussed. The differencing techniques, stability and accuracy issues, data management and optimization issues are discussed by means of a simple example of a particle-in-cell code. Recent advances in simulation methods allowing large space and time scales to be treated with minimal sacrifice in physics are reviewed. Various examples of nonlinear processes successfully studied by plasma simulation will be given. DOE

N85-27684# Oak Ridge National Lab., Tenn. Fusion Energy Div.
PROSPECTS FOR DEVELOPING ATTRACTIVE MAGNETIC FUSION CONCEPTS
John Sheffield 1985 9 p refs Presented at Fusion Power Assoc. Symp. on the Search for Attractive Fusion Concepts, La Jolla, Calif., 31 Jan. - 1 Feb. 1985
(Contract DE-AC05-84OR-21400)
(DE85-006925; CONF-850157-1) Avail: NTIS HC A02/MF A01

Comments are made pertaining to a generic magnetic fusion reactor study carried out at ORNL. A second study was made of the required reactor characteristics for attractive fusion reactors. The physics and economics are achievable with present magnetic configurations. DOE

N85-27685# Oak Ridge National Lab., Tenn.
INHERENT MAGNETIC FIELD ERROR MEASUREMENTS IN ELMO BUMPY TORUS
T. Uckan Feb. 1985 23 p refs
(Contract DE-AC05-84OR-21400)
(DE85-005855; ORNL/TM-9319) Avail: NTIS HC A02/MF A01

The inherent magnetic field error and its radial distribution in the closed field-line device of ELMO Bumpy Torus (EBT) have been measured with and electron beam probe. It is found that the field error is almost radially uniform and is about (DELTA)B less than or equal to 4 G at an average field of B approx. = 7.2 kG. This yields (DELTA)B/B approx. = 0.0005, which is large enough to open the confined drift surfaces of the toroidally circulating electrons as a result of field-error-dominated large radial shifts. By using two pairs of correction coils (loops) around the device, this inherent field error has been successfully reduced to a level of 0.0001 or less. DOE

N85-27686# Oak Ridge National Lab., Tenn.
CHARGE UNCOVERING EFFECTS ON FLUTE INSTABILITIES IN HOT ELECTRON PLASMAS
D. A. Spong Jan. 1985 33 p refs
(Contract DE-AC05-84OR-21400)
(DE85-006957; ORNL/TM-9420) Avail: NTIS HC A03/MF A01

Recent measurements and concurrent theoretical equilibrium models of the ELMO Bumpy Torus (EBT) edge plasma region have indicated that the hot electron ring beta (BETA)/sub hot at the C-T transition may not always be sufficient to produce the local minimum in the magnetic field though to be necessary for MHD stability. This has led to the examination of other mechanisms that could account for the observed stability of the T-mode. In this report, an effect known as charge uncovering, which depends not on the value of (BETA)/sub hot but rather on the ratio n/sub hot/n sub core, is studied. DOE

N85-27687# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTATIONAL PLASMA PHYSICS AND SUPER-COMPUTERS, REVISION 1
J. Killeen and B. McNamara Jan. 1985 32 p refs Presented at the Meeting on Plasma Phys., Trieste, Italy, 24 Sep. 1984
(Contract W-7405-eng-48)
(DE85-007228; UCRL-91511-Rev-1; CONF-840932-2-Rev-1) Avail: NTIS HC A03/MF A01

The supercomputers of the 80's which are 10 to 100 times more powerful than today's machines are introduced. The range of physics modeling in the fusion program is outlined. New machine architecture will influence particular models, but parallel processing poses new programming difficulties. Increasing realism in simulations will require better numerics and more elaborate mathematical models. DOE

N85-27688# California Univ., Livermore. Lawrence Livermore Lab.
SOFTWARE FOR REFLECTIVITY CALCULATIONS OF X-RAY MIRRORS, REVISION 1
J. M. Auerbach and K. G. Tirsell 28 Nov. 1984 14 p refs Presented at Meeting of the Plasma Phys. Div. of the Am. Phys. Soc., Boston, 27 Oct. 984
(Contract W-7405-eng-48)
(DE85-006642; UCRL-91230-Rev-1; CONF-841010-15-Rev-1) Avail: NTIS HC A02/MF A01

With VAX software and the data libraries of Henke and Biggs-Lighthill, a library of atomic scattering factors f1 and f2 in the energy range 0.1 keV to 10.0 keV was created. Scattering factor values for the elements Z = 1 to Z = 94 and in the above energy range are stored in a keyed access library (key = element symbol). This library allows one to calculate reflectivity rapidly and fold it with other components in an X-ray detector channel. Additional software allows the library data to be easily extended to higher energies. Applications have so far included KE X-ray microscopes and low energy spectrometers with mirror channels. DOE

N85-27689# Oak Ridge National Lab., Tenn.
SPHERICAL TORUS, COMPACT FUSION AT LOW FIELD
Y. K. M. Peng Feb. 1985 40 p refs
(Contract DE-AC05-84OR-21400)
(DE85-006983; ORNL/FEDC-84/7) Avail: NTIS HC A03/MF A01

A spherical torus is obtained by retaining only the indispensable components on the inboard side of a Tokamak plasma, such as a cooled, normal conductor that carries current to produce a

toroidal magnetic field. The resulting device features an exceptionally small aspect ratio (ranging from below 2 to about 1.3), a naturally elongated D-shaped plasma cross section, and ramp-up of the plasma current primarily by noninductive means. As a result of the favorable dependence of the Tokamak plasma behavior to decreasing aspect ratio, a spherical torus is projected to have small size, high beta, and modest field. Assuming Mirnov confinment scaling, an ignition spherical torus at a field of 2 T features a major radius of 1.5 m, a minor radius of 1.0 m, a plasma current of 14 MA, comparable toroidal and poloidal field coil currents, an average beta of 24%, and a fusion power of 50 MW. At 2 T, a Q = 1 spherical torus will have a major radius of 0.8 m, a minor radius of 0.5 m, and a fusion power of a few megawatts. DOE

N85-27690# Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering.
TIME-RESOLVING ELECTRON TEMPERATURE DIAGNOSTIC FOR ALCATOR C M.S. Thesis
S. A. Fairfax May 1984 72 p refs
(Contract DE-AC02-78ET-51:013)
(DE85-004916; DOE/ET-51013/124; PFC/RR-84-8) Avail: NTIS HC A04/MF A01

A diagnostic that provides time-resolved central electron temperatures was designed, built, and tested on the ALCATOR C Tokamak. The diagnostic uses an array of fixed-wavelength X-ray crystal monochromators to sample the X-ray continuum and determine the absolute electron temperature. The resolution and central energy of each channel were chosen to exclude any contributions from impurity line radiation. The need for such a diagnostic tool, the design methodology, and the results with typical ALCATOR C plasmas are described. Sawtooth (m = 1) temperature oscillations were observed after pellet fueling of the plasma. This is the first time that such oscillations were observed with an X-ray temperature diagnostic. DOE

N85-27691# California Univ., Livermore. Lawrence Livermore Lab.
KINETIC THEORY AND SIMULATION OF MULTI-SPECIES PLASMAS IN TOKAMAKS EXCITED WITH ICRF MICROWAVES
G. D. Kerbel and M. G. McCoy 21 Dec. 1984 68 p refs
(Contract W-7405-eng-48)
(DE85-008119; UCRL-92062) Avail: NTIS HC A04/MF A01

This paper presents a description of a bounce-averaged Fokker-Planck quasilinear model for the kinetic description of Tokamak plasmas. The non-linear collision and quasilinear resonant diffusion operators are represented in a form conducive to numerical solution with specific attention to the treatment of the boundary layer separating trapped and passing orbit regions of velocity space. The numerical techniques employed are detailed in so far as they constitute significant departure from those used in the conventional uniform magnetic field case. Examples are given to illustrate the combined effects of collisional and resonant diffusion. DOE

N85-27692# Los Alamos Scientific Lab., N. Mex.
FUSION-POWER-CORE DESIGN OF A COMPACT REVERSED-FIELD PINCH REACTOR (CRFPR)
C. Copenhaver, N. M. Schnurr, R. A. Krakowski, R. L. Hagenson (Phillips Petroleum Co., Bartlesville, Okla.), R. C. Mynard, C. Cappiello, R. E. Lujan, J. W. Davidson, A. D. Chaffee, and M. E. Battat 1985 7 p refs Presented at the 6th Topical Meeting on the Technol. of Fusion Energy, San Francisco, 3 Mar. 1985
(Contract W-7405-eng-36)
(DE85-007710; LA-UR-85-516; CONF-850310-24) Avail: NTIS HC A02/MF A01

A conceptual design of a fusion power core (FPC, i.e., plasma chamber, first wall, blanket, shield, coils) based on a Reversed-Field Pinch (RFP) has been completed. After a brief statement of rationale and description of the reactor configuraton, the FPC integration is described in terms of power balance, thermal-hydraulics, and mechanical design. The engineering versatility, promise, and problems of this high-power-density approach to fusion are addressed. DOE

N85-27693# Brookhaven National Lab., Upton, N. Y.
HIGH EFFICIENCY IONIZER USING A HOLLOW CATHODE DISCHARGE PLASMA
J. G. Alessi and K. Prelec 1984 7 p refs Presented at the Workshop on Polarized He-3 Nuclei, Princeton, N.J., 22-24 Oct. 1984
(Contract DE-AC02-76CH-00016)
(DE85-006690; BNL-35663; CONF-8410236-1) Avail: NTIS HC A02/MF A01

A proposal for an ionizer using a hollow cathode discharge plasma is described. Ionization is via the very high current density electron beam component in the plasma, and from charge exchange with plasma ions. It is concluded that extraction of a He(+) current corresponding to approximately 50% of the incoming atomic beam flux should be possible. DOE

N85-27694# Texas Univ., Austin. Inst. for Fusion Studies.
A FOUR-FIELD MODEL FOR TOKAMAK PLASMA DYNAMICS
R. D. Hazeltine, M. Kotschenreuther, and P. J. Morrison Jan. 1985 52 p refs
(Contract DE-FG05-80ET-53088)
(DE85-007111; DOE/ET-53088/165; IFSR-165) Avail: NTIS HC A04/MF A01

A generalization of reduced magnetohydrodynamics is constructed from moments of the Fokker-Planck equation. The new model uses familiar aspect-ratio approximations but allows for evolution as slow as the diamagnetic drift frequency, thereby including certain finite Larmor radius effects; pressure gradient terms in a generalized Ohm's law, thus making accessible the adiabatic electron limit; and plasma compressibility, including the divergence of both parallel and perpendicular flows. The system is isothermal and surprisingly simple, involving only one additional field variable, i.e., four independent fields replace the three fields of reduced magnetohydrodynamics. It possesses a conserved energy. The model's equilibrium limit is shown to reproduce not only the large aspect-ratio Grad-Shafranov equation, but also such finite Larmor radius effects as the equilibrium ion parallel flow. Its linearized version reproduces, inter alia, crucial physics of the long mean-free-path electron response. Nonlinearly, the four-field model is shown to describe diffusion in stochastic magnetic fields with good qualitative accuracy. DOE

N85-27695# Oak Ridge National Lab., Tenn. Fusion Energy Div.
COUPLED PLASMA-NEUTRAL TRANSPORT MODEL FOR THE SCRAPE-OFF REGION
J. D. Galambos, Y.-K. M. Peng, and D. Heifetz (Princeton Plasma Physics Lab.) Mar. 1985 49 p refs
(Contract DE-AC05-84OR-21400)
(DE85-007559; ORNL/FEDC-84/6) Avail: NTIS HC A03/MF A01

Analysis of the scrape-off region requires treatment of the plasma transport along and across the field lines and inclusion of the neutral transport effects. A method for modeling the scrape-off region which uses separate models for each of these aspects that are coupled together through an iteration procedure that requires only minimal numerical effort is presented. The method is applied to estimate the neutral pumping rates in the pump-limiter and divertor options for a proposed deuterium-tritium (D-T) ignition experiment. High neutral recycling in the vicinity of the neutralizer plate dramatically affects pumping rates for both the pump-limiter and divertor. In both cases, the plasma flow into the channel surrounding the neutralizer plate is greatly reduced by the neutral recycling. The fraction of this flow that is pumped can be large, but in general it is dependent on the particular geometry and plasma conditions. It is estimated that pumping speeds approximately greater than 10(5) L/s are adequate for the exhaust requirements in the pump-limiter and the divertor cases. High neutral recycling on the front surface of the limiter tends to increase the neutral pumping rate. DOE

N85-27696# Oak Ridge National Lab., Tenn. Fusion Engineering Design Center.
TOKAMAK SYSTEMS CODE
R. L. Reid, R. J. Barrett, T. G. Brown, G. E. Gorker, R. J. Hooper, S. S. Kalsi, D. H. Metzler, Y. K. M. Peng, K. E. Roth, and P. T. Spampinato Mar. 1985 481 p refs
(Contract DE-AC05-84OR-21400)
(DE85-008147; ORNL/FEDC-84/9) Avail: NTIS HC A21/MF A01

The FEDC Tokamak Systems Code calculates Tokamak performance, cost, and configuration as a function of plasma engineering parameters. This version of the code models experimental Tokamaks. It does not currently consider tokamak configurations that generate electrical power or incorporate breeding blankets. The code has a modular (or subroutine) structure to allow independent modeling for each major Tokamak component or system. A primary benefit of modularization is that a component module may be updated without disturbing the remainder of the systems code as long as the input to or output from the module remains unchanged. DOE

N85-27697# Kiruna Geophysical Inst. (Sweden).
A METHOD OF SOLVING THE DISPERSION EQUATION FOR ELECTROSTATIC ELECTRON WAVES IN MAGNETIZED PLASMA
Bengt Hultqvist Nov. 1984 37 p refs Submitted for publication
(KGI-PREPRINT-071; ISSN-0349-2656) Avail: NTIS HC A03/MF A01

The linear dispersion relation for electrostatic electron waves is analyzed. A method which allows the dispersion equation to be solved and the attenuation rate/growth rate to be derived for longitudinal and quasilongitudinal wave propagation from three simple curves for any propagation angle relative to the magnetic field lines below a limiting value, for any wave length, any magnetic field intensity, any electron density and temperature, and any flow speed of a beam plasma component is described. The effects of cyclotron resonance, which start to be significant at an angle from the direction of the magnetostatic field lines that depends on most of the variables mentioned, is also analyzed. The physical processes involved are discussed. Author (ESA)

N85-26789# Joint Publications Research Service, Arlington, Va.
MEASURING ELECTRICAL FIELD FLUCTUATIONS BY LANGMUIR DOUBLE PROBE METHOD Abstract Only
V. Ye. Korepanov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 15 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 421-425 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26797# Joint Publications Research Service, Arlington, Va.
DETERMINING EFFECTIVE RATE OF PLASMA HEATING IN OUTER EQUATORIAL IONOSPHERE USING DATA FROM ISIS-1 AND ISIS-2 SATELLITES Abstract Only
N. M. Kashchenko and M. A. Nikitin *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 21 Transl. into ENGLISH from Geomagn. i. Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 733-735 Original language doc. was announced in IAA as A85-14532 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N85-27698 Department of the Navy, Washington, D. C.
DUAL SPECIES ION IMPLANTATION OF TERNARY COMPOUNDS BASED ON In-Ga-As Patent
K. Tabatabaie-Alavi, A. N. M. M. Choudhury, N. J. S. Gabriel, and C. G. Fonstad, inventors (to Navy) Issued 22 Jan. 1985 7 p Supersedes AD-D010751
(AD-D011617; US-Patent-4,494,995; US-Patent-Appl-SN-471083; US-Patent-Class-148-1.5) Avail: US Patent and Trademark Office CSCL 20/12

A method for Ion implantation using multiple energy Be+ to produce p-type regions in N-IN(.53)GA(.47)AS. A simple technique is used to develop capless annealing of InGaAs up to 700 C. The ion implantation of silicon is then accomplished to create n+ layers in previously Be-implanted InGaAs epilayers. The active efficiency of 40% for 50 keV Be implant has been found and efficiencies of 86% and 38% are found for the low and high energy Si implants respectively. GRA

N85-27699# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SHALLOW IMPURITY CLUSTER STATES IN n-TYPE SEMICONDUCTORS
A. FerreiradaSilva Apr. 1985 40 p refs Presented at the 2nd Escola Brasil. de Fis. de Semicondutores (II EBFS), Sao Paulo, Brasil, 4-15 Feb. Submitted for publication
(INPE-3495-PRE/732) Avail: NTIS HC A03/MF A01

Shallow impurity states are discussed for n-type semiconductors with emphasis on influence of the cluster states, type of disorder and many valley character of the indirect gap semiconductors. The random nature of the system is taken into account by analytical and simulation formalisms for the noninteracting one-band model and Hubbard and unrestricted Hartree-Fock-Roothaan models for correlated electrons. It is shown that in a wide range of impurity concentrations, such formalisms explain many of the electronic properties of doped semiconductors. The impurity states for a two-dimensional system are also discussed. Author

N85-27700# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ELECTRONIC DENSITY OF STATES FOR THE DOUBLE DONOR SYSTEM Si:P, As
A. FerreiradaSilva and M. Fabbri 29 May 1985 12 p refs Submitted for publication
(INPE-3447-PRE/700) Avail: NTIS HC A02/MF A01

The tight-binding bands arising from the one-electron, effective-mass approximation of the Si:P, As system by a computer simulation are investigated. The approximation is carried out with a double hydrogenic As basis with proper Bohr radii and ionization energies. In the low concentration regime, the effect of the additional vertical disorder appears to be insensitive to the relative mount of As and P atoms. The space-filling argument of Newman and Holcomb is confirmed in the region near the metal to non-metal transition. Author

N85-27701# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ON SOME PHYSICAL IMPURITY PROPERTIES OF DOPED-INDIRECT GAP SEMICONDUCTORS AT LOW AND INTERMEDIATE CONCENTRATIONS
M. Fabbri and L. F. Perondi Mar. 1985 11 p refs Submitted for publication
(INPE-3452-PRE/704) Avail: NTIS HC A02/MF A01

Inclusions of the conduction-band minimal degeneracy in the behavior of the density of states, specific heat and the conductivity for the impurity system doping an indirect-gap semiconductor was done. Here some of these results, together with some physical reasoning to justify the success and fails of such a simple approach are presented. This degeneracy showed very different consequences in distinct physical properties. In particular, the analysis favors the picture of an Anderson-type transition in these materials, as is becoming generally accepted. Author

N85-27702# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DENSITY OF IMPURITY STATES ASSOCIATED TO INVERSION LAYERS
I. C. daCunhaLima, A. FerreiradaSilva, P. S. Guimaraes, L. F. Perondi, and J. R. Senna Feb. 1985 29 p refs Submitted for

publication
(INPE-3406-PRE/675) Avail: NTIS HC A03/MF A01

The density of states for electrons bound to Na(+) impurities at the semiconductor/insulator interface of an MOS structure were obtained, when an inversion layer was established by an external electric field. Impurity bands are calculated for several values of the screening length, distance from the impurities to the inversion layer, and impurity concentration. Results for the obtained bandwidths and the peak values of the density of states are compared with experimental data. E.A.K.

N85-27703# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
OPTIMUM CONVECTION CONDITIONS FOR CZOCHRALSKI GROWTH OF SEMICONDUCTORS
Hans J. Scheel and Jerzy T. Sielawa Jan. 1985 15 p refs Presented at the 6th Intern. Symp. on High-Purity Mater. in Sci. and Technol., Dresden, 6-10 May 1985
(INPE-3395-PRE/665) Avail: NTIS HC A02/MF A01

Time dependence of flow patterns in conventional Czochralski pulling of semiconductor crystals like silicon and gallium arsenide leads to corresponding temperature fluctuations at the growth interface. In order to minimize the resulting inhomogeneities (striations) the general approach is to reduce convection by either applying damping magnetic fields or by growth in microgravity. An alternate approach is the application of enforced convection which leads to homogenization of the whole melt and to the well-defined conditions at the growth interface. The advantages and disadvantages of the various approaches are discussed. E.A.K.

N85-27704# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
IMPURITY BANDS ASSOCIATED WITH MOS INVERSION LAYERS
I. C. daCunhaLima Mar. 1985 9 p refs Submitted for publication
(INPE-3483-PRE/726) Avail: NTIS HC A02/MF A01

Aspects of the impurity band formation in Si/SiO2 MOSFETs are reviewed from the theoretical point of view and some recent results are shown. Differences with bulk doped semiconductors are also pointed out. Possible theoretical efforts for the future are outlined. Author

N85-27705*# Continuum, Inc., Huntsville, Ala.
SIMULATION OF SOLIDIFICATION IN A BRIDGMAN CELL Interim Report
Youssef M. Dakhoul and Richard C. Farmer 22 Aug. 1984 21 p refs
(Contract NAS8-35331)
(NASA-CR-175838; NAS 1.26:175838) Avail: NTIS HC A02/MF A01 CSCL 20L

Bridgman-type crystal growth techniques are attractive methods for producing homogeneous, high-quality infrared detector and junction device materials. However, crystal imperfections and interface shapes still must be controlled through modification of the temperature and concentration gradients created during solidification. The objective of this investigation was to study the temperature fields generated by various cell and heatpipe configurations and operating conditions. Continuum's numerical model of the temperature, species concentrations, and velocity fields was used to describe the thermal characteristics of Bridgman cell operation. Author

N85-27706# Cornell Univ., New York, N.Y. School of Electrical Engineering.
A STUDY OF Ga(.47)In(.53)As AND Al(.48)In(.52)As FOR VERY HIGH FREQUENCY DEVICE APPLICATIONS Final Report, 1 Nov. 1981 - 31 Oct. 1984
L. F. Eastman, G. W. Wicks, and D. W. Woodard Jan. 1985 8 p
(Contract DAAG29-82-K-0011)
(AD-A151995; ARO-18085.10-EL) Avail: NTIS HC A02/MF A01 CSCL 20/12

GaInAs/AlInAs modulation doped structures grown by molecular beam epitaxy (MBE) were studied. The parameters of the MBE growth were adjusted to give high room temperature mobilities (-12000 sq cm/v-sec) and high sheet electron concentrations 2 x 10 to the 12th power per sq cm. Because of higher electron velocities and high conductivities GaInAs modulation doped transistors should be significantly higher speeds than those of GaAs. GRA

N85-27707# Naval Postgraduate School, Monterey, Calif.
A TRANSDUCTION PATH METHOD OF SOLID STATE SENSOR ANALYSIS AND INVESTIGATION M.S. Thesis
C. L. Dubay Sep. 1984 167 p
(AD-A152123; AD-E401303) Avail: NTIS HC A08/MF A01 CSCL 09/1

This paper proposes a transduction path method of analysis for solid state sensors. It is based upon the idea that a sensor represents a transduction path from some input measurand to an electrical output. The transduction path may consist of one or more transduction of modification principles drawn from all fields of science. Also proposed is a transduction path diagram which provides a graphical representation of a transduction path. Background material concerning the development and description of solid state sensors is presented. Sensor measurands are identified and categorized by energy form. The known transduction and modification principles are presented as fundamental building blocks of the transduction path and cross-indexed by measurand. The transduction path diagram is introduced and examples of existing single and multistep transducers are presented. Finally, the transduction path method is shown to be valuable as a systematic method of investigating sensor configurations. Micromachining. GRA

N85-27708# Yale Univ., New Haven, Conn. Dept. of Computer Science.
ON THE CHOICE OF COORDINATES FOR SEMICONDUCTOR SIMULATION
T. Kerkhoven Dec. 1984 30 p
(Contracts N00014-82-K-0184; DE-AC02-81ER10996)
(AD-A152214; YALEU/DCS/RR-350) Avail: NTIS HC A03/MF A01 CSCL 20/12

The semiconductor simulation problem is defined by a set of three coupled nonlinear elliptic partial differential equations. These equations are usually solved either by a coupled or by a decoupling algorithm. Because the solution of semiconductor simulation problems varies over many orders of magnitude, the numerical solution of this nonlinear problem easily gives rise to scaling and conditioning problems in either case. In this report it is shown that important properties of the numerical solution depend on the method of discretization and on three systems of coordinates: The system of coordinates which is used for discretization, the system of coordinates in which we linearize and possibly a third systems of coordinates employed for the solution of the linear systems of equations. For the solution to the original partial differential equations charge is conserved and certain maximum principles are valid. In order to preserve these properties for the discretized solution special care has to be taken with respect to the discretization procedure and the choice of coordinates. It is shown that the choice of solution algorithm and the desire to preserve charge and to obtain acceptable numerical properties restrict the possible discretization procedures and sets of coordinates. GRA

N85-27709# Westinghouse Research and Development Center, Pittsburgh, Pa.
EFFECT OF DISLOCATIONS ON GALLIUM ARSENIDE FETS Research and Development Report, 1 Nov. - 1 Feb. 1985
D. L. Barrett, S. McGuigan, G. W. Eldridge, B. W. Swanson, and R. N. Thomas 15 Feb. 1985 14 p
(Contract N00014-84-C-0632; DARPA Order 5217)
(AD-A152249; Rept-85-9F7-LODIS-R1; Research/Development-2) Avail: NTIS HC A02/MF A01 CSCL 20/2

Indium doping at 5 x 10 to the 19th power/cc was found to be optimum for the growth of low-dislocation GaAs crystals, and

to avoid constitutional supercooling effects. Dislocation etch pit densities of near 200/cc were measured in the central region of In-doped crystals, increasing to above 1000/sq cm in the peripheral regions. Based on the concept that dislocations are generated to relieve excess thermoelastic stress, a preliminary thermal model was used to design a hot zone shield to reduce thermal gradients during growth. An optimum combination of indium-doping, reduced thermal gradient growth, and appropriate growth parameters are expected to yield completely dislocation-free GaAs crystals. A FET metrology mask has been fabricated and preliminary FET device Fabrication begun, for evaluation of the effects of dislocations on FET device parameters. Twenty state-of-the-art, low dislocation, indium-doped GaAs wafers were delivered to the contractor for DARPA-related program evaluation. GRA

N85-27710# Argonne National Lab., Ill. Materials Science and Technology Div.
POSITRON ANNIHILATION STUDIES OF VACANCY FORMATION IN TUNGSTEN, CHROMIUM, AND NIOBIUM
L. C. Smedskjaer, G. D. Loper (Wichita State Univ.), M. K. Chason (Motorola Corp., Schaumburg, Ill.), and R. W. Siegel Nov. 1984 7 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 26-30 Nov., 1984
(Contract W-31-109-eng-38)
(DE85-006837; CONF-8411547-75) Avail: NTIS HC A02/MF A01

Vacancy formation was studied in the refractory bcc metals, tungsten, chromium, and niobium, using the positron annihilation spectroscopy Doppler broadening technique, between room temperature and the respective melting temperatures, under ultra-high vacuum conditions. Temperatures were measured by optical and infrared pyrometry, a W(Rh) thermocouple, and the power delivered to the sample, with calibrations against known melting temperatures. For W, a trapping model analysis of the data from the temperature range 300-3633 K yielded a vacancy formation enthalpy of 3.76 + or - 0.39 eV. For Cr, a similar fit to the data from 296-2049 K yielded a vacancy formation enthalpy of 2.0 + or - 0.2 eV. Results are discussed in relation to previous vacancy formation and self diffusion studies. Measurements on Nb as a function of temperature and oxygen content are also presented. DOE

N85-27711# Oak Ridge National Lab., Tenn.
TRENDS IN THE ELECTRIC FIELD ENHANCEMENT OF DI-ELECTRONIC RECOMBINATION CROSS SECTIONS
D. C. Griffin, M. S. Pindzola, and C. Bottcher 1984 16 p refs Presented at the Workshop on Atomic Spectra and Collisions in External Fields, Gaithersburg, Md., 22 Oct. 1984
(Contract DE-AC09-84OR-21400)
(DE85-006920; CONF-8410237-1) Avail: NTIS HC A02/MF A01

The effect of external electric fields on the dielectronic recombination cross section of selected ions was studied in the configuration average, distorted wave approximation. By applying the linear Stark approximation to the doubly excited Rydberg states formed from resonant recombination, the systematics of field mixing effects on dielectronic recombination was examined and the maximum field enhancement of dielectronic recombination cross sections was determined. DOE

N85-27712# Ames Lab., Iowa.
DENDRITIC GROWTH FROM AMORPHOUS MATRIX M.S. Thesis
V. Laorchan Jan. 1985 67 p refs
(Contract W-7405-eng-82)
(DE85-007630; IS-T-1119) Avail: NTIS HC A04/MF A01

The morphological development of tridymite, SiO2 precipitated from a soda-lead-silicate glass was studied under isothermal conditions. Two different morphologies were observed, i.e., hexagonal and trigonal. These morphologies were dependent on undercooling and they changed from plates at small undercoolings to dendrites and spherulites with increasing undercooling. The growth rate, V, and tip radius, rho, of dendrite were studied as a function of undercooling. The dendrite tip stability criterion, V/rho/(2) = constant, was found to be invalid for this system at high undercooling. The ratio of dendrite tip radius, rho, and initial secondary spacing was found to be constant, equal to 2.0, over the undercooling range of 150 K. The growth and dissolution rates are found to be controlled by the same mechanism. DOE

N85-27713# Delaware Univ., Newark.
POLYCRYSTALLINE SEMICONDUCTOR HETEROJUNCTION MODELLING (CdS/CuInSe(SUB)2) Final Report
K. Boeer Nov. 1984 50 p Prepared in cooperation with Midwest Research Inst.
(Contract DE-AC02-83CH-10093)
(DE85-002913; SERI/STR-211-2440) Avail: NTIS HC A03/MF A01

Solution curves from numerical integration of transport-, continuity-, and Poisson equations are discussed describing the active part of the CdS/CuInSe2 solar cell for a two-carrier, commonly used band model, however with vanishing conduction band edge jump and zero interface recombination. Nevertheless, the resulting current voltage characteristics show V/sub oc/ and fill-factor with high saturation currents. Such behavior is typical for CdS/CuInSe2. One of the major reasons for this loss mechanism is the ambipolar diffusion of carriers from the highly illuminated region in CuInSe2 near the interface into the adjacent, darker region below, where substantial recombination takes place without compensating generation. Substantial improvement of V/sub oc/ and FF can be achieved by reducing the density of recombination centers there. DOE

N85-27714# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
TEM INVESTIGATION OF POLAR-ON-NONPOLAR EPITAXY: GaAs-AlGaAs ON (100) Ge
J. H. Mazur, J. Washburn, T. Henderson, J. Klem, W. T. Masselink, R. Fischer, and H. Morkoc Nov. 1984 8 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 26-30 Nov. 1984 Sponsored in part by AF Prepared in cooperation with Illinois Univ.
(Contract DE-AC03-76SF-00098)
(DE85-007613; LBL-18921; CONF-841157-83) Avail: NTIS HC A02/MF A01

Morphologically excellent GaAs and AlGaAs epitaxial layers have been grown on (100) Ge substrates by molecular-beam epitaxy (MBE). Transmission electron-microscopy (TEM) studies of the thin-film cross sections revealed that defects, most probably antiphase domains, were contained within a 20 to 30 nm thick initial layer near the GaAs/Ge interface, formed with a 0.1-(MU)m/h growth rate at 500(0)C. A reduction of defects occurred in the remaining 0.1-(MU)m thick layer, for which the growth rate and temperature had been increased to 1 (MU)m/h and 580(0)C, respectively. The interface between this GaAs layer and a subsequently grown 35-nm thick AlAs film was found to undulate with a period of 150 to 200 nm and an amplitude of 5 to 10 nm. Such large undulations were not observed in AlGaAs-GaAs superlattices grown after an additional depositions of 2-(MU)m GaAs. High-resolution electron-microscopy observations suggest that transitions between different layers are abrupt on the atomic scale. In addition, modulation-doped field-effect transistors fabricated on these layers had similar characteristics to those obtained with MBE layers grown on GaAs substrates. DOE

N85-27715# Oak Ridge National Lab., Tenn. Solid State Div.
SURFACE MODIFICATION OF SOLIDS
B. R. Appleton May 1984 26 p refs Presented at the American Society for Metals Meeting on Mater. for Energy Systems, Washington, D.C., 1-3 May 1984
(Contract DE-AC05-84OR-21400)
(DE85-007543; CONF-840570-16) Avail: NTIS HC A03/MF A01

The use of ion beam and pulsed laser processing is reviewed for the near-surface modification of a wide range of materials. The techniques of ion implantation doping, ion beam and laser mixing, and pulsed-laser annealing are stressed with particular emphasis on the nonequilibrium aspects of these processing

techniques and on new materials properties which can result. Examples are presented illustrating the utility of these techniques for fundamental materials research as well as practical surface modifications. DOE

N85-27716# Oak Ridge National Lab., Tenn. Solid State Div.
ATOM LOCATION BY ELECTRON CHANNELING ANALYSIS
S. J. Pennycook Jul. 1984 11 p refs Presented at the 4th Anal. Electron Microscopy Workshop, Bethlehem, Pa., 16-20 Jul. 1984 Submitted for publication
(Contract DE-AC05-84OR-21400)
(DE85-007549; CONF-840767-17) Avail: NTIS HC A02/MF A01

For many years the orientation dependence of the characteristic X-ray emission close to a Bragg reflection was regarded as a hindrance to accurate microanalysis, and a random incident beam direction was always recommended for accurate composition analysis. However, this orientation dependence can be put to use to extract information on the lattice location of foreign atoms within the crystalline matrix. Here a generalization of the technique is described which is applicable to any crystal structure including monatomic crystals, and can quantitatively determine substitutional fractions of impurities. The technique was referred to as electron channeling analysis, by analogy with the closely related and widely used bulk technique of ion channeling analysis, and was developed for lattice location studies of dopants in semiconductors at high spatial resolution. Only two spectra are required for each channeling analysis, one in each of the channeling conditions described above. If the matrix and dopant X-ray yields vary identically between the two orientations then the dopant necessarily lies within the reflecting matrix planes. If the dopant X-ray yield does not vary the dopant atoms are randomly located with respect to the matrix planes. DOE

N85-27717# Centre d'Etudes et de Recherches, Toulouse (France). Dept. d'Etudes et de Recherches en Optique.
LIDAR ER2 (OZONE). CRYSTAL CHARACTERIZATION FOR HARMONIC CONVERSION [LIDAR E2 (OZONE). CHARACTERISTIQUES DES CRISTAUX POUR CONVERSION HARMONIQUE]
Yvan Aubry Oct. 1984 85 p refs In FRENCH
(Contract INAG-84-CO-039)
(CERT-2/6129-00) Avail: NTIS HC A05/MF A01

The criteria of crystal choice in a harmonic conversion laser system are examined. Some KDP crystals were studied using laser illumination and interferometric measurement. Photographs obtained with Fabry-Perot, Fizeau, and Michelson interferometers are presented. It is shown that the crystal surface quality control limited to quality measurements at half wave length and wave front distortion are insufficient Author (ESA)

N85-27718# Merck (E.), Darmstadt (West Germany). Chemische Forschung und Entwicklung.
NEMATIC LIQUID CRYSTALS FOR CAR DASHBOARDS Final Report, Dec. 1983
Rudolf Eidenschink, Joackim Krause, Bernard Scheuble, and Georg Weber Bonn Bundesministerium fuer Forschung und Technologie Dec. 1984 86 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-298; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18

Multicomponent nematic phases for car dashboards based on the twisted nematic cell and the quest-host effect were developed. The characteristics of the display types are explained. The properties of the synthesized compounds are described. The properties of these phases allow the production of displays with low switching times, good contrast, and high stability under driving conditions. Author (ESA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N85-27719# Rochester Univ., N. Y. Dept. of Chemistry.
QUANTUM STATISTICAL THEORY OF VIBRATIONAL DYNAMICS IN A LASER-DRIVEN ADMOLECULE-SURFACE SYSTEM Interim Technical Report
X. Y. Huang, T. F. George, and J. M. Yuan Mar. 1985 38 p
(Contract N00014-80-C-0472)
(AD-A152022; UROCHESTER/DC/85/TR-59) Avail: NTIS HC A03/MF A01 CSCL 20/10

A quantum statistical theory for a laser-driven anharmonic oscillator coupled to a system of many degrees of freedom by means of energy and phase dissipative mechanisms is presented. The theory is applied to the description of vibrational dynamics in an admolecule-surface system, which are associated with desorption/dissociation processes. It is found that phase relaxation plays an important role in assisting the laser driving force to overcome the anharmonicity and/or detuning bottleneck, It it also known that a shorter duration of the pulse rule is more efficient for depositing photon energy into the admolecule-system. GRA

N85-27720# Stanford Linear Accelerator Center, Calif.
DISCRETE FOUNDATION FOR PHYSICS AND EXPERIENCE
H. Pierre Noyes Jan. 1985 21 p refs Presented at Quantum Mech. and the Nature of Reality: The Eselen Mind-Phys. Conf., Monterey, Calif., 4-8 Feb. 1985
(Contract DE-AC03-76SF-00515)
(DE85-008172; SU-SLAC-Pub-3566; CONF-850265-1) Avail: NTIS HC A02/MF A01

A discrete quantum scattering theory is derived using bit strings generated and labeled by a simple recursive algorithm. The results could lead to a discrete reconstruction of quantum mechanics compatible with current experience. Implications for the mind-physics problem are briefly discussed. DOE

N85-27721# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
CONFIGURATION SPACE FADDEEV CALCULATIONS Progress Report, 1 Jan. 1984 - 31 Dec. 1984
G. L. Payne, W. H. Klink, and W. N. Polyzou Dec. 1984 27 p refs
(Contract DE-AC02-81ER-40038)
(DE85-005813; DOE/ER-40038/T2) Avail: NTIS HC A03/MF A01

Three-body calculations provide a useful tool for investigating corrections to the present models of nuclear physics. The computer codes required to obtain accurate solutions for the three-body problem in configuration space are being developed. Preliminary calculations of the effect of a three-body force on the trinucleon system were completed. A framework was constructed for building quark models exhibiting Poincare invariance, confinement, scattering, and particle production. Since these degrees of freedom are generally probed with electroweak probes, the necessary conditions on the electroweak current operators were worked out so they transform as 4-vector under the unitary representation of the Poincare group associated with a given relativistic model, and have constructed classes of currents with this property. Finally, any multiparticle amplitude can be related to the scattering amplitude for the crossed reaction, and as a consequence, derived relations between single particle production scattering amplitudes. DOE

N85-27722# Washington Univ., Seattle. Dept. of Physics.
COMMENT ON QUANTUM EFFECTS ON 4-DIMENSIONAL SPACE-TIME SYMMETRIES
R. I. Nepomechie Dec. 1984 2 p refs

(Contract DE-AC06-81ER-40048)
(DE85-007780; DOE/ER-40048/39-P4) Avail: NTIS HC A02/MF A01

It is shown that a theory of charged chiral fermions in four dimensions is free of Lorentz and Einstein anomalies, in the flat spacetime limit. DOE

N85-27723# Washington Univ., Seattle. Dept. of Physics.
MUTLI-PARTICLE QUANTUM MECHANICS OBEYING FRACTIONAL STATISTICS
Yong-Shi Wu 1985 12 p refs
(Contract DE-AC04-81ER-40048)
(DE85-007830; DOE/ER-40048/07-P4) Avail: NTIS HC A02/MF A01

The rule governing many-body wave functions for particles obeying fractional statistics in two (space) dimensions was obtained. It generalizes and continuously interplates the usual symmetrization and antisymmetrization. Quantum mechanics of more than two particles is discussed and some new features are found. In two (space) dimensions, there are allowed to be particles of fractional angular momentum or spin. If there is a generalized spin-statistics connection, such particles are expected to have unusual (fractional) statistics which continuously interpolates between the normal bosons and fermions. A possible relevance of fractional statistics to the quantized Hall effect is suggested. DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N85-27724 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Apparate.
RESEARCH AND DEVELOPMENT. TECHNICAL AND SCIENTIFIC REPORTS 1984 [FORSCHUNG UND ETWICKLUNG. TECHNISCHE-WISSENSCHAFTLICHE N 1984]
1984 354 p refs Partly in ENGLISH and GERMAN
Copyright. Avail: Issuing Activity

Flow-physical aspects in aerodynamics; ultrasonic testing of carbon fiber reinforced plastics using pattern recognition methods; characteristics and applications of superplastic materials for aeronautics and astronautics; and design of cost-effective flight control systems are discussed. The application of computer aided structural optimization to the design of aircraft components; the flight test support aircraft ATTAS; advanced flight simulation for helicopter development; a modular optoelectronic multispectral scanner for Earth observation; and a station for in-orbit testing of satellites are treated. Trends in warhead design; a remotely piloted vehicle for mine identification and disposal; and the transient behavior of a single-blade horizontal axis wind turbine are considered. A digital photogrammetry system; an automated riveting system for aircraft construction; and the testing of slip-controlled railroad wheel sets are outlined. For individual titles, see N85-27725 through N85-27737.

N85-27725 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
NEW FLOW PHYSICAL ASPECTS IN AERODYNAMICS [NEUE STROEMUNGSPHYSIKALISCHE ASPEKTE IN DER AERODYNAMIK] c02
Ernst Heinrich Hirschel *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 11-21 In GERMAN (For primary document see N85-27724 16-81)
(MBB-FE-122/S/PUB/133) Avail: Issuing Activity

Developments in flow physics are discussed. Separated flows, passive and active laminar control of boundary layers, and turbulence management are treated. Author (ESA)

N85-27726 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
ULTRASONIC TESTING OF CARBON FIBER REINFORCED PLASTICS (CFRP) USING PATTERN RECOGNITION METHODS [ULTRASCHALL PRUEFUNG VON CFK MITTELS METHODEN DER MUSTERERKENNUNG] c27
R. Bilgram *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 23-51 refs In GERMAN Presented at Intern. Wehrtech. Symp. CKF-Eigenschaften, Pruefung u. Bewertung von Kohlefaserverstaerkten Kunststoffen, Erding, West Germany, 8-10 May 1985 (For primary document see N85-27724 16-81)
(MBB-BB-563/84-0) Avail: Issuing Activity

The design of an ultrasonic (US) test equipment and its application to CFRP-laminates are described. The system is based on pattern recognition. The application of signal shape analysis and pattern recognition methods to US-testing of complex structures such as CFRP is discussed. It is shown that signal characteristics can be defined and classification algorithms be developed with which US-signals can be conjugated to identified reference signal classes, and hence to defect classes. Examples demonstrate that a measuring system (measuring techniques and software) able to detect non-local production defects with detection rate $>$ 90 % can be built. Author (ESA)

N85-27727 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Hauptabteilung Metalle.
CHARACTERISTICS AND APPLICATIONS OF SUPERPLASTIC MATERIALS FOR AERONAUTICS [EIGENSCHAFTEN UND ANWENDUNGEN SUPERPLASTISCHER WERKSTOFFE FUER DIE LUFT- UND RAUMFAHRT] c27
Peter-J. Winkler *In its* Res. and Develop. Tech. Sci. Repts. 1984 1984 p 53-60 refs In GERMAN (For primary document see N85-27724 16-81)
(MBB-BB-565/84-O) Avail: Issuing Activity

Characteristics and applications of superplastic metallic materials are discussed. The technical requirements for superplastic materials and the composition of technically important superplastic alloys are given. Production techniques and econony of superplastic sheet metal forming are presented. Aeronautics and astronautics applications of aluminum alloys with average and high strength, and titanium alloys are described. Author (ESA)

N85-27728 Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
THE APPLICATION OF COMPUTER AIDED STRUCTURAL OPTIMIZATION TO THE DESIGN OF AIRCRAFT COMPONENTS [ANWENDUNG DER RECHNERGESTUETZTEN STRUKTUROPTIMIERUNG BEI DER AUSLEGUNG VON FLUGZEUGBAUTEILEN] c05
Heinrich Wellen *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 61-68 refs In GERMAN Presented at DGLR-Fachausschusssitzung Festigkeit u. Bauweisen, Neubiberg, West Germany, 5 Jul. 1984 (For primary document see N85-27724 16-81)
(MBB-UT-21/84-O) Avail: Issuing Activity

The Structural Analysis and Redesign System (STARS) program system was used for computer aided structural optimization of aircraft components. Practical use and results, present status, and planned extension of STARS are described. The application of computer aided structural optimization is demonstrated using the inner Airbus A-310 trailing-edge flaps. Computer aided structural optimization offers the possibility of automatic weight-optimal dimensioning of carrying parts using programmed, mathematical methods. The weight optimum leads to time-and cost advantages. Author (ESA)

N85-27729 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Aircraft Div.

SOME ASPECTS OF HOW TO DESIGN COST-EFFECTIVE FLIGHT CONTROL SYSTEMS **c08**

U. Butter and L. Botzler *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 71-84 Presented at 39th AGARD-GCP Panel Meeting/Symp. on Cost-Effective and Affordable Guidance and Control System, Cesme, Turkey, 15-19 Oct. 1984 (For primary document see N85-27724 16-81)

(MBB-LKE-32/S/PUB/143) Avail: Issuing Activity

The minimization of life cycle costs in design of flight control systems for fighter aircraft is discussed. Sensor information processing and actuation systems are dealt with. Size, weight, and power consumption of a system can be reduced using advanced technology components. The obtained benefit has to be balanced against the higher price of these components. There is an interactive relationship between development and operational phases. Increased development effort to improve reliability, maintainability and testability of the system helps to save costs during the in-service phase. Experience shows that the costs invested in development, production, and maintenance of a system are related to each other as 1:3:10. Author (ESA)

N85-27730 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Flight Test Dept.

FLIGHT TEST SUPPORT AIRCRAFT ADVANCED TECHNOLOGIES TESTING AIRCRAFT SYSTEM (ATTAS) FOR THE DFVLR **c05**

Thomas Fleck *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 85-93 Presented at AIAA/AHS/IES/SETP/SFTE/DGLR 2nd Flight Testing Conf., Las Vegas, Nev., 16-18 Nov. 1983 (For primary document see N85-27724 16-81)

(MBB-FE-732/S/PUB/154) Avail: Issuing Activity

The flight testing system ATTAS is presented. The regulating variables for in-flight simulation are given. The control system and security system (controlling force simulation, electrohydraulic actuators, digital control electronics for the electrohydraulic actuators, and systems to switch on and off the test control) are described. The data processing system, including terminal computer, fly-by-wire computer, experiment and control computer, and central communication computer are presented. The cockpit instrumentation and cabin equipment are described. The electric and hydraulic energy systems are explained. Author (ESA)

N85-27731 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

ADVANCED FLIGHT SIMULATION FOR HELICOPTER DEVELOPMENT **c09**

H. Huber, H.-J. Dahl, and A. Inglsperger *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 173-188 refs Presented at AGARD/GCP 38th Panel Meeting Symp. on Helicopter Guidance and Control Systems for Battlefield Support, Monterey, Calif., 7-11 May 1984 Previously announced as N85-16815 Sponsored by West Germany Ministry of Defence (For primary document see N85-27724 16-81)

(MBB-UD-416/84-O) Avail: Issuing Activity

A simulation capability for fixed wing and rotary wing aircraft was developed. The fixed-based simulator consists of interchangeable cockpit stations, and a computer generated imagery (CGI) visual system, both coupled to the mathematical model simulation computer. Specific integration rigs for avionics, flight control and weapon systems can be operated with the simulator. The cockpit for helicopter applications consists of a BO 105 cockpit including flight control, trim system, and standard instruments. The visual scene is produced by a CGI-system consisting of the data base, image generator, and projection unit. The system allows different visibility conditions and simulation of fixed and moving objects. The projection system consists of a three-channel beam splitter. A comprehensive helicopter mathematical model representing the aerodynamic and dynamic complexities of rotary wing aircraft is applied. Author (ESA)

N85-27732 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.

MODULAR OPTOELECTRONIC MULTISPECTRAL SCANNER (MOMS) FOR EARTH OBSERVATION. FIRST RESULTS OF STS-7 MISSION **c35**

D. Meissner, H. Laucht, J. Bodechtel (Technische Univ., Munich), and R. Haydn (Technische Univ., Munich) *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 221-236 refs Presented at Joint Intern. Geosci. and Remote Sensing Symp. (IGARSS 83), San Francisco, 31 Aug. - 2 Sep. 1983 Sponsored by Bundesministerium fuer Forschung und Technologie and DFVLR (For primary document see N85-27724 16-81)

(MBB-UR-717/83-O) Avail: Issuing Activity

The Modular Optoelectronic Multispectral Scanner MOMS-01 was developed. It is a scanning system for remote sensing from aircraft and space platforms. The modularity in grouping of spectral modules and exchanging of optical lens systems and filters allows MOMS to be adapted to completely different mission types. The dedicated tasks are land surface thematic mapping, sea and vegetation monitoring, coastal zone evaluation and, in a stereo mode, photointerpretation and mapping. The ground coverage may be adapted to user needs by changing the photometric layout and focal length, combining detector arrays (line extension) using the dual optics principle. The first mission of a spaceborne two-channel scanner MOMS-01 on the SPAS-01 onboard STS-7 yields highly resolved images with a 20 x 20 sqm pixel size. Author (ESA)

N85-27733 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).

STATION FOR IN-ORBIT TESTING OF SATELLITES [TESTSTATION FUER SATELLITEN IM ORBIT] **c18**

Gerhard Ulrich *In its* Res. and Develop. Sci. and Tech. Repts. 1984 1984 p 237-244 refs In GERMAN (For primary document see N85-27724 16-81)

(MBB-UR-708/84-O) Avail: Issuing Activity

The ground station Test-and Monitoring Station (TMS 1) was designed and built for ESA to test transmission parameters of ECS in-orbit. The station can in a short time fully automatically determine a series of values which give evidence about the quality of the global transmission path. The functional efficiency of the test station is demonstrated with the European satellite OTS. The measurements on ECS-1 are successful. Author (ESA)

N85-27734 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

INVESTIGATIONS OF THE ACCURACY OF THE DIGITAL PHOTOGRAMMETRY SYSTEM (DPS), A RIGOROUS THREE-DIMENSIONAL COMPILATION PROCESS FOR PUSHBROOM IMAGERY **c43**

O. Hofmann *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 277-286 refs Presented at ISPRS Kongr., Rio de Janeiro, Jun. 1984 (For primary document see N85-27724 16-81)

(MBB-UA-753/83-O) Avail: Issuing Activity

A concept for a digital stereoscanner with three line sensor arrays working according to the pushbroom principal, and a suitable analytical compilation method was developed. The system gives the orientation data of the camera along the flight trajectory of aircraft, spacecraft or missiles; the three-dimensional coordinates of the digital elevation model (DEM); ortho and stereo-orthophotos; and geometrically rectified multispectral images. The procedure involves a digital correlation process and does not need any additional information besides the scanner data except a few control points for absolute orientation. Special stabilizations or measurements of flight data are not required. The accuracy of the process was tested by computer simulated models.

Author (ESA)

N85-27735 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Marine and Special Products Div.

THE PINGUIN B3: A REMOTELY PILOTED VEHICLE FOR MINE IDENTIFICATION AND DISPOSAL **c05**

P. Gehrke *In its* Res. and Develop. Tech. and Sci. Repts. 1984

1984 p 287-299 Presented at Intern. Symp. on Mine Warfare Vessels and Systems, London, 12-15 Jun. 1984 (For primary document see N85-27724 16-81)
(MBB-UM-1/84-O) Avail: Issuing Activity

An autonomous mine disposal vehicle compatible with all known mine sweeping sonar systems and which can be integrated in all known mine sweeper concepts was developed. System design (hull construction, hydrodynamics and propulsion, attitude and course control, power supply, sensors and payload, control console) and mission sequence are described. All development testing is successfully completed. Compared to existing systems this system has high performances (speed, payload, endurance), an improved identification capability, an increased mine disposal efficiency, and a larger potential for adaptation to future technology. Author (ESA)

N85-27736 Messerschmitt-Boelkow-Blohm G.m.b.H., Hamburg (West Germany). Unternehmensbereich Transport- und Verkehrsflugzeuge.
UTILIZATION OF AN AUTOMATED RIVETING SYSTEM IN AIRCRAFT CONSTRUCTION [EINSATZ VON AUTOMATISIERTEN NIETANLAGEN IM FLUGZEUBAU] c05
Juergen Maskow *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 301-307 In GERMAN Presented at Jahrestagung der DGLR, Hamburg, 1-3 Oct. 1984 (For primary document see N85-27724 16-81)
(MBB-UT-11/84-O; DGLR-84-087) Avail: Issuing Activity

Rationalization and human factors engineering of the production of riveted joints is described. Shell assembly, clip-frame assembly, and fuselage section assembly were investigated on alternative rationalized production techniques with reduced noise levels. The Automated Riveting Assembly System fulfills all the requirements concerning short time in process, high flexibility and operator comfort in civil aircraft construction. Author (ESA)

N85-27737 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
TRANSIENT BEHAVIOR OF A SINGLE-BLADE HORIZONTAL-AXIS WIND TURBINE c44
R. Wennekers *In its* Res. and Develop. Tech. and Sci. Repts. 1984 1984 p 327-345 refs Presented at 10th European Rotorcraft Forum, The Hague, 28-31 Aug. 1984 (For primary document see N85-27724 16-81)
(MBB-UD-421/84-O) Avail: Issuing Activity

The transient behavior of the wind energy converter (WEC) MONOPTEROS was investigated. This converter is a 1:3 model scale test version (tower height 50 m) of a single-blade 5.4 MW horizontal-axis supercritically operating wind turbine. Aerodynamic and dynamic modelling techniques, the development of control strategies for the transition into/out of nominal performance, and simulated and measured time histories with emphasis on transient operating conditions, are presented. For the prediction of transients, which are the most problematic operating phases of the supercritical, single-blade wind turbine concept, the modeling of classical, stationary rotor aerodynamics is sufficient, but an exact description of the control system is required. Author (ESA)

N85-27738# Naval Postgraduate School, Monterey, Calif.
A SUMMARY OF THE NAVAL POSTGRADUATE SCHOOL RESEARCH PROGRAM Summary Report, 1 Oct. 1982 - 30 Sep. 1983
Jun. 1984 367 p
(AD-A151721; NPS-012-84-003PR) Avail: NTIS HC A16/MF A01 CSCL 05/2

This report contains 221 summaries on research projects which were carried out under funding to the Naval Postgraduate School Research Program. This research was carried out in the areas of Computer Science, Mathematics, Administrative Sciences, Operations Research, National Security Affairs, Physics, Electrical Engineering, Meterology, Aeronautics, Oceanography and Mechanical Engineering. The Table of Contents identifies the areas of research. GRA

N85-27739# Naval Postgraduate School, Monterey, Calif.
COMPILATION OF ABSTRACTS OF THESES SUBMITTED BY CANDIDATES FOR DEGREES Report, for 1 Oct. 1982 - 30 Sep. 1983
Jun. 1984 509 p
(AD-A151722; NPS-012-84-004PR) Avail: NTIS HC A22/MF A01 CSCL 05/2

This publication contains the abstracts of theses submitted during the period 1 October 1982 - 30 September 1983 by candidates for Masters, Engineers, and Doctors degrees at the Naval Postgraduate School, Monterey, CA 93943. Degrees are in Aeronautical engineers, mechanical engineers, applied mathematics, applied science, computer science, electrical engineering, information systems, management, mechanical engineering, meteorology and oceanography, operations research, national security affairs and others. GRA

N85-27740# Naval Postgraduate School, Monterey, Calif.
RECENT NAVAL POSTGRADUATE SCHOOL PUBLICATIONS Summary Report, 1980 - 1983
Jun. 1984 289 p
(AD-A151723; NPS-012-84-002PR) Avail: NTIS HC A13/MF A01 CSCL 05/2

This publication contains a listing for each faculty member from each department of the Naval Postgraduate School, indicating the conference presentations, contributions to books, published papers and technical reports and notes for the years 1980 - 1983. GRA

N85-27741# Naval Academy, Annapolis, Md.
SUMMARY OF RESEARCH, ACADEMIC DEPARTMENTS, 1983 - 1984 Annual Report, Jul. 1983 - Jun. 1984
W. L. Heflin Oct. 1984 259 p
(AD-A151724; USNA-9) Avail: NTIS HC A12/MF A01 CSCL 05/2

This annual report summarizes the research work of the Naval Academy faculty and midshipmen for the period July 1983 through June 1984. Sponsored and independent research projects are listed by title, followed by the names of the investigators and an abstract. A list of publications and their abstracts are included as well as presentations at professional meetings, conferences, and seminars. Subjects include: Aerospace Engineering, Electrical Engineering, Mechanical Engineering, Naval Systems Engineering, Weapons and Systems Engineering, English, History, Chemistry, Computer Science, Mathematics, Oceanography, Physics, Leadership and Law, Economics, Language Studies, and Political Science. GRA

N85-27742# Naval Postgraduate School, Monterey, Calif.
MANAGEMENT CONSIDERATIONS FOR AN INFORMATION CENTER M.S. Thesis
J. D. Auvil Sep. 1984 52 p
(AD-A151774) Avail: NTIS HC A04/MF A01 CSCL 09/2

Recent studies have shown that the data processing industry has a very severe problem to solve. In the next few years there is going to be an extensive increase in millions of instructions per second available due to increases in hardware technology. It is imperative that the software development industry find ways to utilize this capability. Increased programmer productivity is the key. This thesis introduces the Information Center concept that will allow management to better utilize existing data processing capability by providing users the tools required for increased software productivity. An actual government installation is used as an example of using a modern Systems Analysis approach in the installation of an Information Center. Industry trends are discussed and the debate of centralization versus decentralization presented. Author (GRA)

N85-27743# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PERSONAL COMPUTER AIDED DECISION ANALYSIS M.S. Thesis
G. R. White 14 Dec. 1984 273 p

(AD-A151911; AFIT/GSO/OS/84D-8) Avail: NTIS HC A12/MF A01 CSCL 09/2

The increasing complexity of today's business and military decisions demand informed decision making at all levels of management. Such decision making must be fully supported by timely and accurate analysis. Computers are well-suited for such analysis. Unfortunately, the large mainframe computers are not flexible or responsive enough for use by most managers in a timely manner. The growing popularity, presence, and capability of microcomputers represents a new opportunity for operations research. These small, low-cost machines can provide much of the computer support needed for decision making by managers and analysts provided that the necessary software tools are developed. This thesis was undertaken to provide a user-oriented decision analysis tool which exploits the advantages of personal computers. Of the many useful quantitative techniques available, the weighting and constraint techniques of multi-objective decision analysis were selected and implemented. GRA

N85-27744# Naval Material Command, Washington, D. C.
NAVY PROGRAM MANAGER'S GUIDE, 1985 EDITION Final Report
G. S. Handler, G. Hemmerle, and W. Rucker Jan. 1985 277 p (AD-A151925; NAVMAT-P-9494) Avail: NTIS HC A13/MF A01 CSCL 15/5

The guide describes the Department of the Navy system acquisition process, leaning heavily on lessons learned in past acquisition programs. It outlines the system acquisition process, identifies participants and describes their roles, describes the procedures necessary to move the program from one milestone to the next, and identifies possible pitfalls along the way. The Guide, where possible outlines methodologies and strategies and directs the program manager to specific sources of assistance. It is an introduction and ready reference to the Navy acquisition process, not a formal instruction. GRA

N85-27745# Naval Postgraduate School, Monterey, Calif.
AUTOMATION OF THE REPORTING AND TRACKING REQUIREMENTS OF ARCHITECT-ENGINEERING TYPE CONTRACTS M.S. Thesis
J. T. Etheridge Sep. 1984 126 p
(AD-A152218) Avail: NTIS HC A07/MF A01 CSCL 15/5

The Naval Facilities Engineering Command utilizes several automated systems in carrying out its mission. These systems are presently geared toward the Headquarters and major Command levels of management and not toward the field activities and smaller offices. This thesis examines an Architect-Engineer type contracting management procedure and proposes an automated alternative of the contract administration process using micro-computer technology for field activities. A brief examination is made of the NAVFAC automated systems and of the structure of the NAVFAC contracting organization prior to the presentation of a proposed A-E Management Information System. The closing chapters discuss integration of the proposed system, automated tools which make the system possible and the interface designs utilized to make the system user friendly. GRA

N85-27746# Texas A&M Univ., College Station. Coll. of Business Administration.
MANAGEMENT CONTROL SYSTEMS AND INTERDEPENDENCIES: AN EMPIRICAL STUDY
N. B. Macintosh and R. L. Daft Mar. 1985 33 p
(Contract N00014-83-C-0025)
(AD-A152280; TR-ONR-DG-13) Avail: NTIS HC A03/MF A01 CSCL 05/1

Two themes in behavioral accounting research suggest that management accounting system characteristics are related to characteristics of the larger organization and that the management accounting system is one element in a control system package. The research reported here investigates the relationship between departmental interdependencies and the design and use of three management control systems - the operating budget, periodic statistical reports, and standard operating policies and procedures. The findings support the idea that interdependency between departments influences the emphasis placed on specific management control systems. Standard operating procedures are an important control device when interdependence is moderate. When interdependence between departments is high, the role of all three control systems diminish. The findings support the themes that accounting based systems are one device in the organizational control package and that control systems are employed differently according to organizational characteristics.
Author (GRA)

N85-26651# European Organisation for the Safety of Air Navigation, Brussells (Belgium).
A COST-EFFICIENT CONTROL PROCEDURE FOR THE BENEFIT OF ALL AIRSPACE USERS
Andre Benoit and Sip Swierstra *In* AGARD Cost Effective and Affordable Guidance and Control Systems refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-26657# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany). Missile Div.
SIMULATION: A TOOL FOR COST-EFFECTIVE SYSTEMS DESIGN AND LIVE TEST REDUCTION
Roland Gaugett *In* AGARD Cost Effective and Affordable Guidance and Control Systems Feb. 1985 9 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-27106*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NETWORK INFORMATION MANAGEMENT SUBSYSTEM
C. C. Chatburn *In its* The Telecommun. Data Acquisition Rept. 15 May 1985 p 109-115 refs (For primary document see N85-27094 16-32)
Avail: NTIS HC A08/MF A01 CSCL 05A

N85-27809 Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
MANAGERIAL BENEFITS OF HELIOS FOR THE EUROPEAN INDUSTRY [GEWINN AN MANAGEMENTFAEHIGKEITEN DURCH HELIOS FUER DIE EUROPAETISCHE INDUSTRIE]
Ants Kutzer and Bernd-J. Madauss *In* DFVLR Ten Years of Helios 1984 p 162-171 In ENGLISH and GERMAN Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

N85-27810 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
THE TECHNOLOGICAL GAINS OF HELIOS FOR THE EUROPEAN INDUSTRY [DER TECHNISCHE NUTZEN VON HELIOS FUER DIE EUROPAEISCHE INDUSTRIE]
Victor Billig *In* DFVLR Ten Years of Helios 1984 p 172-179 In GERMAN and ENGLISH (For primary document see N85-27794 16-92)
Avail: Issuing Activity

N85-27812 European Space Agency. European Space Operations Center, Darmstadt (West Germany).
HELIOS PROJECT SUPPORT
Kurt Jeftman *In* DFVLR Ten Years of Helios 1984 p 189-192 In ENGLISH and GERMAN (For primary document see N85-27794 16-92)
Avail: Issuing Activity

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N85-27747 Illinois Univ., Urbana-Champaign.
RETRIEVAL PERFORMANCE IN A FULL TEXT JOURNAL ARTICLE DATABASE Ph.D. Thesis
Carol Tenopir 1984 264 p
Avail: University Microfilms Order No. DA8502315

It is often assumed that the availability of the full text of journal articles for online searching will make abstracting and indexing obsolete and that search results with full text will be superior to the results of bibliographic searching. These assumptions were tested by comparing results from searching the full text of journal articles in the Harvard Business Review Online database on a commercial search system with the results from searching on the titles and the value-added fields of abstract and controlled vocabulary. There was a significant difference at the .05 level between the full text and other methods for total documents retrieved, recall ratio, and overlap and uniqueness of specific documents retrieved. Full text searching contributed a significantly greater number of documents, had a significantly higher recall, and contributed a significantly higher number of unique documents. Its precision ratio was lower than other search methods. Dissert. Abstr.

N85-27748 Illinois Univ., Chicago.
AN ADAPTIVE TECHNIQUE AND ITS APPLICATION IN DATABASE DESIGN Ph.D. Thesis
Chai-Hsiung Chen 1984 124 p
Avail: University Microfilms Order No. DA8501236

The problem of allocating files to sites in distributed database systems is investigated. A general model without committing to any specific query processing algorithm is introduced. Based on the model, an adaptive algorithm is proposed. The file allocation problem in two different distributed database environments using different classes of query processing algorithms and the application of the algorithm to the problem are presented in detail. The algorithm has any desirable properties. Query statistics need not be collected in advance. Instead, each time a query is processed, useful information is extracted by the algorithm. Estimation is used minimally. This assures that cost computation is accurate. Sudden changes in users' access pattern can be easily detected by the algorithm. Other properties regarding accuracy and convergence of the algorithm are derived. Experimental results are provided to justify the usefulness of the algorithm. Dissert. Abstr.

N85-27749 Illinois Univ., Urbana-Champaign.
ACCESS PATH OPTIMIZATION FOR NETWORK DATABASE RETRIEVAL Ph.D. Thesis
Huei-Huang Chen 1984 116 p
Avail: University Microfilms Order No. DA8502102

In evaluating a query using a network database, the links need to either be followed or be saved. Two new data retrieval methods are presented so that the links are saved in a database relation for later use. The method proposed combine traditional relational and network retrieval methods. In many cases, these new methods show substantial performance improvement in evaluating queries using network databases [CK84a]. The proposed methods are useful for database retrieval from network databases as well as from relational databases implemented with links [CK84b]. A high-level query interface is usually provided to translate a user's queries into efficient network queries. The query optimization algorithms for such a system are presented in a stepwise fashion by beginning with finding an optimal access path for a given access tree using the proposed methods as well as the traditional method of database retrieval. Dissert. Abstr.

N85-27750 Illinois Univ., Urbana-Champaign.
DESIGN OF AN INTERFACE TO AN INFORMATION RETRIEVAL NETWORK Ph.D. Thesis
Josephine DeGuizman Mendoza 1984 192 p
Avail: University Microfilms Order No. DA8502245

The use of computers for information retrieval has brought about a growth of databases (bibliographic, in particular) as well as an increase in the number of search service centers (SSCs) that make the databases accessible online. This thesis proposes an interface to these SSCs and databases to make the variabilities transparent to the user - an Automatic IRC. The Automatic IRC, aimed to be a full-service information center, provides the following services for the user: (1) assistance in the formation of the query; (2) assistance in the choice of relevant databases and location of SSC(s) that make the database(s) accessible at a low cost; (3) automatic dial-up and log-on to the SSCs and the databases; (4) translation of the user query into a format that can be processed by the SSC retrieval system; (5) post-processing of bibliographic citations from online searches (i.e., sorting, merging, eliminating duplicate citations and finishing the output); and (6) location, ordering and delivery of documents. Dissert. Abstr.

N85-27751# Naval Postgraduate School, Monterey, Calif.
INTERNAL AND EXTERNAL PERFORMANCE MEASUREMENT METHODOLOGIES FOR DATABASE SYSTEMS M.S. Thesis
R. C. Tekampe and R. J. Watson Jun. 1984 100 p
(AD-A152025) Avail: NTIS HC A05/MF A01 CSCL 09/2

The scope of this thesis is twofold. The first is to provide a methodology for the performance measurement of database systems. The second is the application of this methodology to a specific database system in an attempt to verify the applicability of this methodology and the performance and capacity claims of the database system. As a methodology, the thesis describes the strategies and locations for the placement of checkpoints, the kinds of performance data to be collected, the environment for the conduct of the performance measurement and the interpretation of the results. One of the most important contributions of this methodology is its capability to obtain actual measurement overhead making the presentation of truly accurate results possible. As an application of this methodology, we attempt to validate the performance and capacity claims of an experimental multi-backend database system known as MDBS. Surprisingly, these claims have been validated. Author (GRA)

N85-27752# Naval Postgraduate School, Monterey, Calif.
DATA DICTIONARY DESIGN AS A STEPPING-STONE TO DBMS (DATA BASE MANAGEMENT SYSTEM) IMPLEMENTATION IN THE INDONESIAN ARMY DATA COLLECTING AND PROCESSING SERVICE M.S. Thesis
B. Sutedjo Sep. 1984 86 p
(AD-A152101) Avail: NTIS HC A05/MF A01 CSCL 09/2

The organizational structure, tasks, and system configuration of the Indonesian Army Data Collecting and Processing Service (DISPULLAHTAD) are presented briefly in order to provide a background for succeeding discussions. Features of available data dictionary systems (DDS) and the initial design of a data dictionary for current applications at DISPULLAHTAD are presented. Finally, based on that initial design, a recommendation for database management system (DBMS) implementation is discussed. dictionary schema; DISPULLAHTAD; Data dictionary features; GRA

N85-27753# Maryland Univ., College Park. Computer Vision Lab.
APPLICATION OF HIERARCHICAL DATA STRUCTURES TO GEOGRAPHICAL INFORMATION SYSTEMS Final Contract Report, 27 Sep. 1983 - 26 Sep. 1984
H. Samet and A. Rosenfeld Fort Belvoir, Va. Army Engineer Topographic Labs. 13 Nov. 1984 117 p
(Contract DAAK70-81-C-0059)
(AD-A152169; ETL-0376) Avail: NTIS HC A06/MF A01 CSCL 08/2

In Phase I of the project, a database was built that contained three maps supplied under the terms of the contract. These maps

described the flood plain, elevation contours, and landuse classes of a region in California. The map regions were represented in quadtree form, and algorithms were developed for basic operations on quadtree-represented regions (set-theoretic operations, point-in-region determination, region property computation, and submap generation). The efficiency of these algorithms was studied theoretically and experimentally. In Phase II of the project a quadtree based Geographic Information System was partially implemented, allowing manipulation of images storing area, point and line data. This system included a memory management system to allow manipulation of images too large to fit into main memory, a software package to allow users to edit and update images, database management and map manipulation functions, and an English-like query language with which to access the database. Phase III of this project primarily dealt with enhancements and alteration to this information system package, an evaluation of some of the design decisions, and the collection of empirical results to indicate the utility of the software and to justify the indicated design decisions. Included with this report is a survey of appropriate data structures for future investigation vis-a-vis the current system. GRA

N85-27754# Department of Defense, Washington, D. C. Directorate for Information Operations and Reports.
DOD MANUAL FOR STANDARD DATA ELEMENTS, PART 1
Oct. 1984 174 p
(AD-A152201; DOD-5000.12-M-Pt-1) Avail: NTIS HC A08/MF A01 CSCL 09/2

This Manual is published by DIOR provides a current reference source for DoD-approved standard data elements and codes. In addition, it contains general guidelines and criteria for the standardization of data elements and data codes. DoD 5000.12-M, December 1, 1982, is hereby CANCELLED. This volume contains an INTRODUCTION of background information on data element and data codes standardization, the organization of the Manual and how to use it. Section 2.0, STANDARDIZATION PROCEDURES AND CRITERIA, specifies the procedures for standardizing data elements and codes in the Department of Defense and the criteria to the applied in the standardization process. Section 3.0, DoD STANDARD DATA ELEMENTS AND CODES, contains listings of all DoD standard data elements and data codes by standard reference number, name and keyword out of context. Section 4.0, OBSOLETE DATA ELEMENTS AND CODES, lists the obsolete DoD Data elements and data codes in standard reference number order, alphabetically by name, and by keyword out of context. GRA

N85-27755# Department of Defense, Washington, D. C. Directorate for Information Operations and Reports.
DOD MANUAL FOR STANDARD DATA ELEMENTS, PART 2
Oct. 1984 352 p
(AD-A152202; DOD-5000.12-M-Pt-2) Avail: NTIS HC A16/MF A01 CSCL 09/2

This DIOR report is a KWOC index for a DoD data element and data use identifier system. Each keyword is listed, its context is spelled out, a reference number is available to the appropriate section of this DoD manual. GRA

N85-27756# Department of Defense, Washington, D. C. Directorate for Information Operations and Reports.
DOD MANUAL FOR STANDARD DATA ELEMENTS, PART 3
Oct. 1984 409 p
(AD-A152203; DOD-5000.12-M-Pt-3) Avail: NTIS HC A18/MF A01 CSCL 09/2

This DIOR report is a KWOC index for a DoD data element and data use identifier system each keyword is listed, its context is spelled out, a Reference number is available to the appropriate section of its DoD manual. GRA

N85-27757# Department of Defense, Washington, D. C. Directorate for Information Operations and Reports.
DOD MANUAL FOR STANDARD DATA ELEMENTS, PART 4
Oct. 1984 436 p
(AD-A152204; DOD-5000.12-M-Pt-4) Avail: NTIS HC A19/MF A01 CSCL 09/2

This is a DIOR dictionary for data elements. Each entry lists the element, a definition, data code characteristics, abbreviations, a code, and an explanation of the element. GRA

N85-27758# Department of Defense, Washington, D. C. Directorate for Information Operations and Reports.
DOD MANUAL FOR STANDARD DATA ELEMENTS, PART 5
Oct. 1984 467 p
(AD-A152205; DOD-5000.12-M-Pt-5) Avail: NTIS HC A20/MF A01 CSCL 09/2

This is a DIOR dictionary for data elements. Each entry lists the element, a definition, data code characteristics, abbreviations, a code, and an explanation of the element. GRA

N85-27759# Naval Postgraduate School, Monterey, Calif.
A DICTIONARY-DIRECTORY SYSTEM (DDS) FOR THE SPLICE SYSTEM M.S. Thesis
V. Panagiaris Jun. 1984 85 p
(AD-A152223) Avail: NTIS HC A05/MF A01 CSCL 09/2

As a result of growing demands for Automated Data Processing at the Navy Stock Points and Inventory Control Points, long range plans are being developed around the Stock Point Logistics Interface Communications Environment (SPLICE) concept. Problems and opportunities are involved with designing and using distributed systems. This thesis investigates the area of data dictionary/directory systems with special focus or distributed systems and attempts to cutline the benefits for the SPLICE system from the use of a data dictionary/directory system. Interface consideration between data dictionary/directory system (DDS) and neighboring modules are also discussed. GRA

N85-27760# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
SCIENTIFIC DATA BASES ON A VAX-11/780 RUNNING VMS
Carmen M. Benkovitz and Joyce L. Tichler 1984 10 p refs Presented at DECUS Fall Symp., Anaheim, Calif., 10-14 Dec. 1984
(Contract DE-AC02-76CH-00016)
(DE85-007925; BNL-36031; CONF-841249-5) Avail: NTIS HC A02/MF A01

At Brookhaven National Laboratory several current projects are developing and applying data management techniques to compile, analyze and distribute scientific data sets that are the result of various multi-institutional experiments and data gathering projects. An overview of a few of these data management projects is presented. DOE

N85-27761# Department of Energy, Oak Ridge, Tenn. Office of Scientific and Technical Information.
ENERGY DATA BASE: SUBJECT THESAURUS
J. S. Redford, ed. Nov. 1984 984 p
(DE84-010568; DOE/TIC-7000/R6) Avail: NTIS HC A99/MF E04

The Energy Data Base subject thesaurus contains the standard vocabulary of indexing terms (descriptors) developed and structured by the technical staff of the DOE Office of Scientific and Technical Information as part of its subject indexing activities. The terminology controls the subject searching of the Energy Data Base available on the DOE on-line retrieval system (DOE-RECON) and on commercial on-line systems. Over 25,000 entries are contained in the thesaurus and each entry includes hierarchical relationships and related term lists. M.G.

N85-27762# National Bureau of Standards, Gaithersburg, Md. Inst. for Computer Sciences and Technology.
FUTURE INFORMATION TECHNOLOGY, 1984: TELECOMMUNICATIONS
Peg Kay, ed. and Patricia Powell, ed. Dec. 1984 334 p refs Sponsored in part by IRS and Office of the Secretary of Defense Prepared in cooperation with Little (Arthur D.) Inc., Aurora Associates, Inc., Titan Systems, Inc., and International Data Corp.

(NBS/SP-500/119; T185-901186; LC-84-601149) Avail: NTIS HC A15/MF A01

Telecommunications technology and related areas in computer organizations are considered. Topics covered include: the telecommunications forecast through 1999, three perspectives on the divestiture of AT&T, a general impacts of technology on computer security, and the management implications of the trends in information technology. An industry workshop on this forecast is summarized and the 1983 forecast is updated. A glossary of terms is included. A.R.H.

N85-27763# California Univ., Berkeley. Lawrence Berkeley Lab.
DATA MANAGEMENT ISSUES OF STATISTICAL DATABASES
A. Shoshani Aug. 1984 23 p refs Presented at AICA Ann. Conf. on Inform. and Automatic Computation, Rome, 23 Oct. 1984
(Contract DE-AC03-76SF-00098)
(DE85-007616; LBL-18814; CONF-8410243-1) Avail: NTIS HC A02/MF A01

The nature of statistical data bases and the special problems associated with them are discussed. The characteristics of statistical data bases are described in terms of data structures and usage. Problems unique to statistical databases are discussed, as well as work in progress. The problems and solutions are organized into the following areas: physical organization, logical modeling, user interface, and the integration of statistical analysis and data management functions. DOE

N85-27764# National Bureau of Standards, Gaithersburg, Md. Public Information Div.
NBS (NATIONAL BUREAU OF STANDARDS) RESEARCH REPORTS
Oct. 1984 32 p refs
(PB85-127421; NBS/SP-680/1; LC-84-601124) Avail: NTIS HC A03/MF A01 CSCL 14B

Cooperation and communication; research update; factory automation; standard data formats; transferring part designs between systems; computer system security; cold circuits in electronics revolution; new particles for measurement; industrial radiation; compositional mapping; new publications; and conference calendar are examined. B.G.

N85-26656# Software Sciences Ltd., Farnborough (England).
MAINTAINING CONSISTENCY AND ACCOMMODATING NETWORK REPAIR IN A SELF-REGENERATIVE DISTRIBUTED DATABASE MANAGEMENT SYSTEM (A DISCUSSION OF THE MEANS AND COST)
M. Reilly, P. R. Tillman, R. Catt, and R. B. Moore *In* AGARD Cost Effective and Affordable Guidance Control Systems Feb. 1985 11 p refs (For primary document see N85-26638 16-01)
Avail: NTIS HC A13/MF A01

N85-27025# Tohoku Univ., Sendai (Japan).
THE DESIGN OF AN ENGLISH WORD-PROCESSOR FOR SCIENTIFIC AND TECHNICAL USE IN WHICH SUPERSCRIPTS, SUBSCRIPTS AND GREEK CHARACTERS ARE OPERATED BY SCREEN-EDIT. 3
Junichi Mashiko, Susumu Mashiko, and Shigetoshi Katsura *In its* The Record of Elec. and Comm. Eng. Conversazione, Vol. 53, No. 2, Nov. 1984 Nov. 1984 p 24-37 refs In JAPANESE and ENGLISH (For primary document see N85-27022 16-31)
Avail: NTIS HC A04/MF A01

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N85-27765# Committee on Commerce, Science, and Transportation (U. S. Senate).
SOVIET SPACE PROGRAMS, 1976-1980 (WITH SUPPLEMENTARY DATA THROUGH 1983). PART 3: UNMANNED SPACE ACTIVITIES
Marcia S. Smith, Geoffrey E. Perry, and Patricia E. Humphlett Washington GPO 1985 392 p refs Rept. presented to the Comm. on Com., Sci., and Transportation, 98th Congr., 1st Sess., May 1985 Prepared by Congressional Research Service, Library of Congress
(S-Prt-98-235-Pt-3; GPO-44-199) Avail: SOD HC

Soviet space science programs and the Soviet military space programs, including its long history of anti-satellite activity are reviewed. Applications of space activities to the Soviet economy; channel frequencies and utilization in the Soviet communications satellite systems; radio transmissions from Soviet navigation satellites; and KOSHOS coverage of the early stages of the Gulf War are covered. B.G.

N85-27766# Committee on Energy and Commerce (U. S. House).
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION AUTHORIZATION
Washington GPO 1984 78 p Hearing on H. R. 5497 before the Subcomm. on Telecommun., Consumer Protection, and Finance of the Comm. on Energy and Com., 98th Congr., 2nd Sess., 24 Apr. 1984
(GPO-38-660) Avail: Subcommittee on Telecommunications, Consumer Protection, and Finance

A bill to authorize appropriations for the National Telecommunications and Information Administration (NTIA) for the fiscal years 1985 and 1986 is given. The activities of the NTIA are discussed. R.J.F.

N85-27767# Committee on Foreign Relations (U. S. Senate).
EAST-WEST COOPERATION IN OUTER SPACE
Washington GPO 1984 122 p refs Hearing on S. J. Res. 236 before the Comm. on Foreign Relations, 98th Congr., 2nd Sess., 13 Sep. 1984
(S-Hrg-98-1064; GPO-39-395) Avail: Committee on Foreign Relations

A joint resolution was introduced to congress to extend the 1972-77 outer space cooperation agreement between the United States and Soviet union. G.L.C.

N85-27768# Committee on Appropriations (U. S. House).
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT-INDEPENDENT AGENCIES APPROPRIATIONS FOR 1986. PART 6: NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington GPO 1985 1026 p refs Hearings before a subcomm. of the Comm. on Appropriations, 99th Congr., 1st Sess., 1985
(GPO-47-235) Avail: Committee on Appropriations

The president's budget for NASA of $7.9 billion allocate $2.9 billion for research and development; $3.5 billion for space flight, control and data communications; $149 million for construction of facilities; and $1.3 billion for research and program management. Space station and space shuttle budgetary requirements are explored in detail, along with space science, science and applications, commercial programs/technology utilization and aeronautics research and technology. E.R.

N85-27079# Joint Publications Research Service, Arlington, Va.
INTERNATIONAL COOPERATION IN SPACE EXPLORATION
Ivana Balkova *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-85-019) 21 May 1985 p 3-5 Transl. into ENGLISH from Tribuna (Prague), 27 Mar. 1985 p 15 (For primary document see N85-27077 16-31)
Avail: NTIS HC A03/MF A01

N85-27808 Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
THE SIGNIFICANCE OF HELIOS FOR EUROPE [DIE BEDEUTUNG VON HELIOS FUER EUROPA]
Ants Kutzer *In* DFVLR Ten Years of Helios 1984 p 159-161 In ENGLISH and GERMAN (For primary document see N85-27794 16-92)
Avail: Issuing Activity

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N85-27769*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OVERVIEW OF THE 1985 NASA LEWIS RESEARCH CENTER SP-100 FREE-PISTON STIRLING ENGINE ACTIVITIES
Jack G. Slaby 1985 21 p refs Presented at the 20th Intersoc. Energy Conversion Engr. Conf., Miami Beach, Fla., 18-23 Aug. 1985; cosponsored by ASME, ANS, SAE, IEEE, AIAA, ACS, and AIChE
(Contract DE-Ai05-82OR-1005)
(NASA-TM-87028; DOE/NASA/1005-5; NAS 1.15:87028; E-2584) Avail: NTIS HC A02/MF A01 CSCL 10B

This effort is keyed on the design, fabrication, assembly, and testing of a 25 kWe Stirling space-power technology-feasibility demonstrator engine. Another facet of the SP-100 project covers the status of a 9000-hr endurance test conducted on a 2 kWe free-piston Stirling/linear alternator system employing hydrostatic gas bearings. Dynamic balancing of the RE-1000 engine (a 1 kWe free-piston Stirling engine) using a passive dynamic absorber will be discussed along with the results of a parametric study showing the relationships of Stirling power converter specific weight and efficiency as functions of Stirling engine heater to cooler temperature ratio. Planned tests will be described covering a hydrodynamic gas bearing concept for potential SP-100 application. Author

N85-27770# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
EXPERIENCE OF THE INSTITUTE OF SPACE RESEARCH WITH THE USE OF REMOTE SENSING IN URBAN PLANNING STUDIES [A EXPERIENCIA DO INPE NO USO DE SENSORIAMENTO REMOTO PARA ESTUDOS DE PLANEJAMENTO URBANO]
Jun. 1984 18 p refs In PORTUGUESE Presented at the 4th Congr. Brasil. de Geografos, Sao Paulo, Brazil, 14-23 Jul. 1984 and at the 4th Ann. Reunion of the Soc. de Especialistas Latinoamericanos en Perception Remota, Santiago de Chile, 12-16 Nov. 1984
(INPE-3159-PRE/533) Avail: NTIS HC A02/MF A01

The experience of researchers at Brazil's Institute of Space Research with the development and application of methods related to the use of remote sensing data is described. Since 1973 this experience has involved the use of photographic products at low altitudes as well as the acquisition of orbital data. Studies are described which employ remote sensing data to monitor urban land use, urban growth, quality of life, and socioeconomic characteristics. The application of remote sensing data for the purpose of implementing urban mathematical models is discussed. Transl. by B.G.

N85-27771*# Eaton Corp., Southfield, Mich. Engineering and Research Center.
AC POWERTRAIN FOR AN ELECTRIC VEHICLE, PHASE 2 AND PHASE 3 Final Report
J. M. Slicker Nov. 1984 389 p refs Sponsored in part by NASA
(Contract DE-AC08-81NV-10320)
(NASA-CR-175760; NAS 1.26:175760; DE85-006655; DOE/NV-10320/2) Avail: NTIS HC A17/MF A01 CSCL 13F

Work relating to Phase 2 and 3 development and testing of an ac powertrain for a 25 hp four-passenger electric vehicle is described. The system, which consists of a two-speed automatic mechanical transaxle, 18.6 kW ac induction traction motor, 33.6 kW inverter and overall logic controller, was installed and evaluated in a converted Mercury Lynx rolling test bed vehicle. An on-board charger and an auxiliary dc-to-dc converter were integrated into the inverter/controller package. DOE

N85-27772# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
INEL ELECTRIC VEHICLE LABORATORY QUALIFICATION: TRANSITION TEST RESULTS AND COMPARISONS WITH JPL ETV1-2 DATA
Robert L. Crumley Nov. 1984 161 p refs
(Contract DE-AC07-76ID-01570)
(DE85-008006; EGG-SE-6743) Avail: NTIS HC A08/MF A01

The Idaho National Engineering Laboratory (INEL) was selected to test and evaluate electric and hybrid vehicle systems and selected electric vehicle battery systems. A series of transition tests was conducted to demonstrate that the INEL is a qualified replacement for JPL. The transition tests, and the facilities and systems used are described. Results from the tests demonstrate that INEL test data can confidently be compared with JPL test data. This comparison allows continuity in the overall DOE evaluation of the state of electric vehicle development and clearly qualifies INEL as a competent replacement for JPL. DOE

N85-27773# Transportation Systems Center, Cambridge, Mass.
HYBRID PROPULSION TECHNOLOGIES FOR URBAN BUS TRANSIT Final Report, Jan. - Jun. 1983
R. Gunderson and H. Wychorski Nov. 1984 65 p
(Contract MA-06-0120)
(PB85-157469; DOT-TSC-UMTA-84-31; UMTA-MA-06-0120-84-4) Avail: NTIS HC A04/MF A01 CSCL 13F

Information on hybrid propulsion technologies is presented to increase the transit community's awareness and understanding of bus propulsion designs that offer extended use capability for trolley-emergency, short-range, and back-up propulsion for trolley buses or offer some overall energy or fuel savings. Technical material is provided on systems that are novel or appear to offer the greatest potential for future commercial development. Advancements in hybrid technology that could help in better utilization existing equipment or help in decisions regarding the procurement of new vehicles. GRA

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N85-27774 California Inst. of Tech., Pasadena.
THERMAL AND MAGNETIC PROPERTIES OF NEUTRON STARS Ph.D. Thesis
Lars Eric Hernquist 1984 312 p
Avail: University Microfilms Order No. DA8501333

The interaction of the magnetic field with the heat flux in

neutron stars is investigated. It is proposed that the magnetic field develops as a result of thermal processes in the liquid and solid phases of neutron star envelopes. Necessary conditions for the growth to occur are derived and it is shown that surface fields comparable to those observed would result. The magnetization of neutron stars in binary systems (which have magnetic properties differing substantially from those of isolated pulsars) can be explained by thermal processes associated with accretion flows. In order to study magnetic effects on neutron star cooling a number of subsidiary issues are considered. The thermal structure of unmagnetized neutron star envelopes is examined using approximate analytical models. From the results is possible to justify a number of simplifying assumptions and extend them to the magnetized case. Dissert. Abstr.

N85-27775*# Montreal Univ. (Quebec). Dept. de Physique.
STUDIES OF HOT B SUBDWARFS. PART 2: ENERGY DISTRIBUTIONS OF THREE BRIGHT sdB/sdOB STARS IN THE 950-5500 ANGSTROM RANGE
F. Wesemael, J. B. Holberg (Arizona Univ.), S. Veilleux, R. Lamontagne, and G. Fontaine 11 Feb. 1985 33 p refs Sponsored in part by NSF, ESA, NSERC of Canada, and by the Centre de Calcul of Montreal Univ.
(Grants NAGw-587; NAG5-411)
(NASA-CR-175854; NAS 1.26:175854) Avail: NTIS HC A03/MF A01 CSCL 03A

Voyager ultraviolet spectrometer observations of the subdwarf B or OB stars HD 205805, UV 1758+36 and Feige 66 are presented. All three objects display the H I Layman series in absorption. These observations are combined with low dispersion IUE spectrophotometry and with Stroemgren photometry to construct virtually complete energy distributions, which extend over the range 950-5500 angstroms. Effective temperatures based on model atmosphere calculations for high gravity, hydrogen rich stars are determined. Our analyses yield T Sub e 28,200 + or - 1300 K for HD 205805, T sub e 31, 800 + or - 1100 K for UV 1758+36, and T sub e 35,700 + or - 1500 K for Feige 66. The importance of far ultraviolet observations below L sub alpha in reducing the uncertainties associated with the interstellar extinction and the degradation of the IUE sensitivity is emphasized. Author

N85-27776# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ACOUSTO-OPTICAL SPECTROMETERS AT ITAPETINGA RADIO OBSERVATORY
E. Scalise, Jr., J. L. MonteirodoVale, Y. Bakor, and R. E. Schaal Mar. 1985 8 p refs Presented at the 4th IAU Reg. Meeting, Rio de Janeiro, Nov. 1984 Submitted for publication
(INPE-3479-PRE/722) Avail: NTIS HC A02/MF A01

The characteristics of two low cost acousto-optical spectrometers are presented. They will be used mainly for line work in the frequency range from 20 to 45 GHz. The first instrumental stability tests indicate that integration times lasting for several minutes are possible. Author

N85-27777# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RADIO OBSERVATIONS OF COMET P/CROMMELIN
E. Scalise, Jr., Z. Abraham, and J. L. MonteirodoVale 29 May 1985 6 p refs Presented at the 4th IAU Reg. Meeting, Rio de Janeiro, Nov. 1984 Submitted for publication
(INPE-3480-PRE/723) Avail: NTIS HC A02/MF A01

The upper limits of the radio continuum and line measurements at approximately 22 GHz of comet P/ Crommelin are presented briefly. The results may be valuable in programming the observations of comet P/Halley. Author

N85-27778# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CALIBRATION METHODS IN MILLIMETER-WAVE RADIOASTRONOMY
Z. Abraham Mar. 1985 7 p refs Presented at the 4th IAU Reg. Meeting, Rio de Janeiro, Nov. 1984 Submitted for publication
(INPE-3481-PRE/724) Avail: NTIS HC A02/MF A01

A calibration method for millimeter wave observations that automatically compensates the atmospheric attenuation, even in the presence of a radome, or when the mean kinetic temperature of the sky is smaller than the ambient temperature is described. Author

N85-27779# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DALL-NULL TESTER FOR SPACEBORNE APPLICATIONS M.S. Thesis
R. L. Wingler Dec. 1984 74 p
(AD-A151772; AFIT/GEP/PH/84D-14) Avail: NTIS HC A04/MF A01 CSCL 17/8

This is a study to design a self correcting primary mirror system for a space telescope. The design is centered around a Dall-Null tester (a Foucault knife-edge tester with compensating lens). An indepth study of the theory of the Foucault test from Foucault's original publications to current work is presented. Also short comings of the diffraction approach are shown. The findings of a simple experiment showed the way to the correct explanation as to the workings of the test. Based on this new explanation, a computer program to find the error in the surface of the mirror from the irradiance pattern provided by the Dall-Null tester was developed. The computer program with a sample run is included in the appendixes A and B. The basic design of an adaptive optic system for a spaceborne application is also presented in the paper. This design has the desired quality of being able to correct the mirror while the telescope is in use. The equations being independent of wavelength allows for the design to be applied to systems working outside of the visible spectrum as well as the systems working in the visible. Author (GRA)

N85-27306# Joint Publications Research Service, Arlington, Va.
ASTROMETRIC METHOD ADVANCES ASTRONOMY, GEODESY
In its China Rept: Sci. and Technol. (JPRS-CST-85-012) 23 Apr. 1985 p 98-99 refs Transl. into ENGLISH from Xinhua (Beijing), 27 Mar. 1985 (For primary document see N85-27300 16-42)
Avail: NTIS HC A07/MF A01

N85-27803* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE HELIOS RADIO ASTRONOMY EXPERIMENT
Susan Kayser and Robert Stone *In* DFVLR Ten Years of Helios 1984 p 111-114 Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N85-27780 Illinois Univ., Urbana-Champaign.
A NUMERICAL STUDY OF NONSPHERICAL BLACK HOLE ACCRETION Ph.D. Thesis
John Frederick Hawley 1984 277 p
Avail: University Microfilms Order No. DA8502167

A two-dimensional, axisymmetric computer code for calculating fully relativistic ideal gas hydrodynamics around a Kerr black hole is described. The aim is to study fully dynamic inviscid fluid accretion onto black holes, as well as to study the evolution and development of nonlinear instabilities in pressure supported accretion disks. In order to fully calibrate and document the code, certain analytic solutions for shock tubes and special accretion flows are derived; these solutions form the basis for code testing. The numerical techniques used are developed and discussed. A variety of alternate differencing schemes are compared on an analytic test bed. Some discussion is devoted to general issues in finite differencing. The working code is calibrated using analytically solvable accretion problems, including the radial accretion of dust

and of fluid with pressure (Bondi accretion). Two dimensional test problems include the spiraling infall of low angular momentum fluid, the formation of a pressure supported torus, and the stable evolution of a torus. Dissert. Abstr.

N85-27781*# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
COMETARY ATMOSPHERES: MODELING THE SPATIAL DISTRIBUTION OF OBSERVED NEUTRAL RADICALS Interim Report, Sep. - Nov. 1984
Michael R. Combi Jan. 1985 14 p refs
(Contract NASw-3950)
(NASA-CR-175852; NAS 1.26:175852) Avail: NTIS HC A02/MF A01 CSCL 03B

The dependencies on heliocentric velocity for the solar photodissociation lifetime and the solar fluorescence rate of the OH radical were incorporated into the Monte Carlo particle trajectory model for cometary radicals. For the case of CN a study was initiated on the effects of using several different adopted models on the calculation of production rates from filter photometry. Progress in these areas is discussed. A comparison of two different sets of scale length data for cometary C2 and CN is also presented. Author

N85-27782*# Lowell Observatory, Flagstaff, Ariz.
MONODEURATED METHANE IN THE OUTER SOLAR SYSTEM. 2. ITS DETECTION ON URANUS AT 1.6 MICRONS
C. deBergh (Kitt Peak National Observatory), B. L. Lutz, t. Owen (Kitt Peak National Observatory), J. Brault (National Solar Observatory), and J. Chauville (Observatoire de Paris) 21 May 1985 35 p refs Sponsored in part by NSF
(Grants NsG-7499; NGL-33-015-141)
(NASA-CR-175762; NAS 1.26:175762) Avail: NTIS HC A03/MF A01 CSCL 03B

Deuterium in the atmosphere of Uranus has been studied only via measurements of the exceedingly weak dipole lines of hydrogen-deuteride (HD) seen in the visible region of the spectrum. The other sensitive indicator of deuterium in the outer solar system is monodeuterated methane (CH3D) but the two bands normally used ot study this molecule, NU sub 2 near 2200 1/cm and NU sub 6 near 1161 1/cm, have not been detected in Uranus. G.L.C.

N85-27783*# Cornell Univ., Ithaca, N.Y. Center for Radiophysics and Space Research.
MOLECULAR SPECTROSCOPY FROM THE KUIPER AIRBORNE OBSERVATORY Final Technical Report, 1 Oct. 1979 - 31 Dec. 1984
Steven Beckwith May 1985 7 p refs
(Grant NsG-2412)
(NASA-CR-175748; NAS 1.26:175748) Avail: NTIS HC A02/MF A01 CSCL 03B

Interstellar and circumstellar molecules are investigated through medium-resolution infrared spectrosocpy of the vibration-rotation and pure rotational transitions. A primary goal was the construction and improvement of instrumentation for the near and middle infrared regions, wavelengths between 2 and 10 microns. The main instrument was a cooled grating spectrometer with an interchangeable detector focal plane which could be used on the Kuiper Airborne Observatory (KAO) for airborne observations, and also at ground-based facilities. Interstellar shock waves were investigated by H2 emission from the Orion Nebula, W51, and the proto-planetary nebulae CRL 2688 and CRL 618. The observations determined the physical conditions in shocked molecular gas near these objects. From these it was possible to characterize the energetic history of mass loss from both pre- and post-main sequence stars in the regions. Author

N85-27784*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN INTERPLANETARY MAGNETIC FIELD ENSEMBLE AT 1 AU
William H. Matthaeus, M. L. Goldstein, and J. H. King Apr. 1985 48 p refs
(NASA-TM-86209; NAS 1.15:86209) Avail: NTIS HC A03/MF A01 CSCL 03B

A method for calculation ensemble averages from magnetic field data is described. A data set comprising approximately 16 months of nearly continuous ISEE-3 magnetic field data is used in this study. Individual subintervals of this data, ranging from 15 hours to 15.6 days comprise the ensemble. The sole condition for including each subinterval in the averages is the degree to which it represents a weakly time-stationary process. Averages obtained by this method are appropriate for a turbulence description of the interplanetary medium. The ensemble average correlation length obtained from all subintervals is found to be 4.9 x 10 to the 11th cm. The average value of the variances of the magnetic field components are in the approximate ratio 8:9:10, where the third component is the local mean field direction. The correlation lengths and variances are found to have a systematic variation with subinterval duration, reflecting the important role of low-frequency fluctuations in the interplanetary medium. Author

N85-27785*# National Radio Astronomy Observatory, Charlottesville, Va.
THE STRUCTURE OF GALACTIC HI IN DIRECTIONS OF LOW TOTAL COLUMN DENSITY
Felix J. Lockman, Keith Jahoda (Wisconsin Univ., Madison), and Dan McCammon (Wisconsin Univ., Madison) [1985] 58 p refs Sponsored in cooperation with NSF
(Grant NAG5-629)
(NASA-CR-175709; NAS 1.26:175709) Avail: NTIS HC A04/MF A01 CSCL 03B

A detailed 21 cm study of areas of that have the smallest known amount of HI in the northern sky was performed. These observations were corrected for stray radiation. The region of main interest, around alpha = 10(h)45(m), delta = 57 deg 20', has a minimium N(HI) of 4.5 x 10 to the 19th power/sq cm. Spectra taken at 21' resolution over a field 4 x 3 deg in this direction show up to four HI line components. Two, near 0 and -50 km/s, are ubiquitous. There is also a narrow component at -10 km/s attributable to a diffuse cloud covering half of the field, and scattered patches of HI at $v < -100$ km/s. the low and intermediate velocity components have a broad line width and are so smoothly distributed across the region that it is unlikely that they contain significant unresolved angular structure. Eight other low column density directions were also observed. Their spectra typically have several components, but the total column density is always > 7 x 10 to the 19th power/sq cm and changes smoothly along a 2 deg strip. Half of the directions show narrow lines arising from weak diffuse HI clouds that contain 0.5 to 3.0 x 10 to the 19th power/sq cm. M.G.

N85-27786# Stanford Linear Accelerator Center, Calif.
DARK MATTER, GALAXIES, AND LARGE SCALE STRUCTURE IN THE UNIVERSE
Joel R. Primack Jul. 1984 89 p refs Presented at Intern. School of Phys. Enrico Fermi, Varenna, Italy, 26 Jun. - 6 Jul. 1984
(Contract DE-AC03-76SF-00515)
(DE85-008053; SU-SLAC-PUB-3387; CONF-8406212-3) Avail: NTIS HC A05/MF A01

Current research on the nature of the cosmological dark matter and the origin of galaxies, clusters, superclusters and voids are presented. The observational data is reviewed and a tentative theoretical framework within which it can be interpreted: gravitational collapse of fluctuations as the origin of structure in an expanding universe is introduced. General relativistic cosmology is summarized, the data on the basic cosmological parameters reviewed and the theory of the growth and collapse of fluctuations is introduced. The idea of cosmological inflation, and critique of a proposal to modify gravity as an alternative to dark matter are outlined. Arguments that dark matter is nonbaryonic are summarized, and the standard astrophysical classification of varieties of dark matter is introduced: hot (free streaming erases all but supercluster-size fluctuations), warm (free streaming erases fluctuations smaller than large galaxies), and cold (free streaming

is cosmologically unimportant). The various particle physics candidates for dark matter are reviewed, together with possible tests that could constrain or eliminate them. DOE

N85-27787# Washington Univ., Seattle. Dept. of Physics.
INFLATION FROM EXTRA DIMENSIONS
S. M. Barr 1984 5 p refs Presented at Inner Space/Outer Space Conf., Batavia, Ill., 2 May 1984
(Contract DE-AC06-81ER-40048)
(DE85-007834; DOE/ER-40048/12-P4; CONF-8405155-6) Avail: NTIS HC A02/MF A01

Recently there is growing interest in the possibility that the universe could have more than four dimensions. Aside from any light this may shed on problems in particle physics, if true it would undoubtedly have important implications for early cosmology. A rather speculative but very appealing possibility suggested by D. Sadhdev and by E. Alvarez and B. Gavela is that the gravitational collapse of extra spatial dimensions could drive an inflation of ordinary space. This kind of inflationary cosmology would be quite different from the inflationary cosmologies now so intensively studied which are supposed to result from changes in vacuum energy during phase transitions in the early universe. The physics of these Kaluza-Klein inflationary cosmologies are examined and three main conclusions were reached. It is desirable to have many extra dimensions, many being of order forty or fifty. For models which give a realistically large inflation almost all of this inflation occurs in a period when quantum gravity is certainly important. This means that Einstein's equations cannot be used to calculate the details of this inflationary period. Under plausible assumptions one may argue from the second law of thermodynamics that given appropriate initial conditions a large inflation will occur even when details of the inflationary phase cannot be calculated classically. DOE

N85-27788# Los Alamos Scientific Lab., N. Mex. Earth and Space Sciences Div.
OPTICAL PULSAR IN THE LARGE MAGELLANIC CLOUD REMNANT 0540-69.3
J. Middleditch and C. R. Pennypacker (LBL) 1984 9 p refs Presented at a Workshop on the Crab Nebula and Related Supernova Remnants, Washington, D.C., 11-12 Oct. 1984
(Contract W-7405-eng-36)
(DE85-006707; LA-UR-85-286; CONF-8410232-1) Avail: NTIS HC A02/MF A01

Pulsed optical emission was detected from the Large Magellanic Cloud (LMC) X-ray pulsar PSR 0540-693 (Seward et al. 1984). The pulsed emission has a time averaged magnitude of approximately 22.7. The X-ray pulsar was discovered in the LMC remnant, 0540-69.3 as a pulse repetition period of approx. 50 milliseconds (ms) in Einstein Observatory data. Earlier, it was noted that this remnant resembles the Crab Nebula because of the X-ray power law spectrum, and suggested that the nebular emission was sychrotron radiation powered by a central pulsar. After the announcement of X-ray pulsed emission, the broad optical band properties of the nebula were measured and evidence for synchrotron emission. They reported that the 4.5 arc second continuum emission remnant has only a tenth the luminosity of the Crab Nebula. We have recorded broad-band optical time-series data at 1 ms intervals with the 4-m and 1.5-m Cerro Tololo telescopes and have found strong pulsations, employing the usual Fourier transform methods. A summary of the observations, including magnitudes, barycentric frequencies and times of arrival is given. DOE

N85-26792# Joint Publications Research Service, Arlington, Va.
IONIZATION COEFFICIENT FOR ATOMIC COLLISIONS IN METEOR TRAIL Abstract Only
K. Kh. Saidov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 17-18 Transl. into ENGLISH from Dokl. Akad. Nauk Tadzh. SSR (Dushanbe, USSR), v. 27, no. 7, Jul. 1984 p 372-375 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26816# Joint Publications Research Service, Arlington, Va.
HELIOCENTRIC SAIL PROBLEM WITH VARIABLE GRAVITY FIELD REDUCTION Abstract Only
Ye. N. Polyakhova *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 58-59 Transl. into ENGLISH from Vestn. Leningr. Univ.: Mat., Mekhan., Astron. (Leningrad), no. 4, Oct. 1984 p 63-68 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27796 Max-Planck-Inst. fuer Astronomie, Heidelberg (West Germany).
ZODIACAL LIGHT: A REPLICA OF THE INTERPLANETARY DUST CLOUD [ZODIAKALLICHT: EIN ABBILD DER INTERPLANETAREN STAUBWOLKE]
Christoph Leinert, Eckhart Pitz, and Hartmut Link *In* DFVLR Ten Years of Helios 1984 p 50-57 In ENGLISH and GERMAN Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

N85-27800* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. Dept. di Phisica.
ROME/GODDARD SPACE FLIGHT CENTER (GSFC) MAGNETIC FIELD EXPERIMENT: A SUMMARY OF RESULTS
F. Mariani, N. Ness, B. Bavassano (CNR, Frascati, Italy), L. Burlaga, S. Cantarano (Aquila Univ., Italy), C. Scearce (NASA Goddard Space Flight Frascati, Italy), R. Terenzi (CNR, Maryland), and U. Villante (Aquila Univ., Italy) *In* DFVLR Ten Years of Helios 1984 p 90-99 Prepared in cooperation with Rome Univ. Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N85-27789# Los Alamos Scientific Lab., N. Mex.
HYDROGEN RECOVERY FROM EXTRATERRESTRIAL MATERIALS USING MICROWAVE ENERGY
D. S. Tucker, D. T. Vaniman, J. L. Anderson, F. W. Clinard, Jr., R. C. Feber, Jr., H. M. Frost, T. T. Meek, and T. C. Wallace 1984 16 p refs Presented at Lunar Bases and Space Activities of the 21st Century, Washington, D.C., 29 Oct. 1984
(Contract W-7405-eng-36)
(DE85-006717; LA-UR-85-370; CONF-8410230-6) Avail: NTIS HC A02/MF A01

The feasibility of recovering hydrogen from extraterrestrial materials (lunar and Martian soils, asteroids) using microwave energy is presented. Reasons for harvesting and origins and locations of hydrogen are reviewed. Problems of hydrogen recovery are discussed in terms of hydrogen release characteristics and microwave coupling to insulating materials. From results of studies of hydrogen diffusivities (oxides, glasses) and tritium release (oxides) as well as studies of microwave coupling to ilmenite, alkali basalt and ceramic oxides it is concluded that using microwave heating in hydrogen recovery from extraterrestrial materials could be the basis for a workable process. DOE

N85-27790*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DIRECT EVIDENCE FOR SOLAR WIND CONTROL OF JUPITER'S HECTOMETER-WAVELENGTH RADIO EMISSION
Michael D. Desch and Colin H. Barrow Mar. 1984 21 p refs
(NASA-TM-86073; NAS 1.15:86073) Avail: NTIS HC A02/MF A01 CSCL 03B

Observations of the solar wind close to Jupiter, by the Voyager 1 and Voyager 2 spacecraft in 1978 and 1979, are compared

with the hectometer wavelength radio emission from the planet. A significant positive correlation is found between variations in the solar wind plasma density at Jupiter and the level of Jovian radio emission output. During the 173-day interval studied for the Voyager 2 data, the radio emission displayed a long term periodicity of about 13 days, identical to that shown by the solar wind density at Jupiter and consistent with the magnetic sector structure association already proposed for groundbased observations of the decameter wavelength emission. Author

N85-27791# Los Alamos Scientific Lab., N. Mex.
NEUTRINO MEASUREMENTS ON THE MOON
Albert G. Petschek 1984 4 p refs Presented at the Symp. on Lunar Bases and Space Activities in the 21st Century, Washington, D.C., 29 Oct. 1984 Prepared in cooperation with New Mexico Inst. of Mining and Technol.
(Contract W-7405-eng-36)
(DE85-007700; LA-UR-85-419; CONF-8410230-10) Avail: NTIS HC A02/MF A01

Several possible neutrino experiments on the Moon are discussed in the light of the expected background rates. DOE

N85-27792# Monsanto Research Corp., Miamisburg, Ohio.
AN ANALYSIS OF ALTERNATE HYDROGEN SOURCES FOR LUNAR MANUFACTURE
Herbert N. Friedlander 1984 10 p refs Presented at the Lunar Bases and Space Activities of the 21st Century, Washington, D.C., 29 Oct. 1984
(Contract DE-AC04-76DP-00053)
(DE85-007234; MLM-3224(OP); CONF-8410230-4) Avail: NTIS HC A02/MF A01

A limitation to the exploration and use of space for scientific and industrial enterprise is the high cost of energy needed to overcome the Earth's gravitational field in order to lift terrestrial materials into space. The reuseable space shuttle reduces the capital cost of ferrying such materials to near earth orbit but has little impact on the energy cost. The material requirements of servicing satellites in geosynchronous orbit and of exploring and colonizing the moon and nearby planets will be even more expensive in energy if all that material must be of terrestrial origin. One cost reducing alternative is to use materials already available in near Earth space, that is on the moon and on asteroids with earth approaching orbits. DOE

N85-27793# Los Alamos Scientific Lab., N. Mex.
SURFACE EXPLORATION GEOPHYSICS APPLIED TO THE MOON
M. E. Ander 1984 12 p refs Presented at Lunar Bases and Space Activities of the 21st Century, Washington, D.C., 29 Oct. 1984
(Contract W-7405-eng-36)
(DE85-006714; LA-UR-85-364; CONF-8410230-5) Avail: NTIS HC A02/MF A01

With the advent of a permanent lunar base, the desire to explore the lunar near-surface for both scientific and economic purposes will arise. Appplications of exploration geophysical methods to the Earth's subsurface are highly developed. This paper briefly addresses some aspects of applying this technology to near surface lunar exploration. It is noted that both the manner of application of some techniques, as well as their traditional hierarchy as assigned on Earth, should be altered for lunar exploration. In particular, electromagnetic techniques may replace seismic techniques as the primary tool for evaluating near-surface structure. DOE

N85-26807# Joint Publications Research Service, Arlington, Va.
MECHANISM OF FORMATION OF LOW TEMPERATURES IN NIGHTTIME VENUSIAN THERMOSPHERE
B. G. Gordiyets and Yu. N. Kulikov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 32 Transl. into ENGLISH from Pisma v Astron. Zh. (Moscow), v. 10, no. 9, Sep. 1984 p 696-701 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26808# Joint Publications Research Service, Arlington, Va.
ORIENTATION AND STRENGTH OF MARTIAN MAGNETIC DIPOLE Abstract Only
Sh. Sh. Zhuzgov and V. A. Sharova *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 32-33 Transl. into ENGLISH from Kosmich. Issled. (Moscow), v. 22, no. 3, May - Jun. 1984 p 440-449 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26809# Joint Publications Research Service, Arlington, Va.
POSSIBLE CONFIGURATION OF MARTIAN MAGNETOSPHERE Abstract Only
V. N. Smirnov and I. L. Izraylevich *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 33-34 Transl. into ENGLISH from Kosmich. Issled. (Moscow), v. 22, no. 3, May - Jun. 1984 p 450-456 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26810# Joint Publications Research Service, Arlington, Va.
POSSIBLE PERIOD OF JOVIAN ACTIVITY AND POSSIBILITY OF SEASONS Abstract Only
A. P. Vidmachenko, A. F. Steklov, and N. F. Minyaylo *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 34 Transl. into ENGLISH from Pisma v Astron. Zh. (Moscow), v. 10, no. 9, Sep. 1984 p 691-695 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27797 Max-Planck-Inst. fuer Kernphysik, Heidelberg (West Germany).
THE MICROMETEORITE EXPERIMENT ON HELIOS [DAS MIKROMETEORITENEXPERIMENT AUF HELIOS]
Eberhard Gruen, Hugo Fechtig, and Jochen Kissel *In* DFVLR Ten Years of Helios 1984 p 58-63 In ENGLISH and GERMAN Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N85-27794 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).
TEN YEARS OF HELIOS
Herbert Porsche, ed. 1984 200 p refs Partly in ENGLISH and GERMAN Sponsored by Bundesministerium fuer Forschung und Technologie Original contains color illustrations
(ISBN-3-88135-156-6) Copyright. Avail: Issuing Activity

Goals and objectives of the Helios project are reviewed. Zodiacal light observation, micrometeorite experiments, solar wind experiments, and magnetic field experiments are presented. Plasma waves in the solar wind, solar radio bursts, remote sensing of the solar corona, and Faraday rotation in the solar corona were investigated. Galactic and solar cosmic rays are observed. The significance of Helios for Europe, and the managerial benefits and technological gains of Helios for European industry are treated. The Helios ground operations and project support are discussed. For individual titles, see N85-27795 through N85-27812.

N85-27795 Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
THE HELIOS MISSIONS [DIE HELIOS-MISSIONENT] c12
Ants Kutzer *In* DFVLR Ten Years of Helios 1984 p 39-44 In ENGLISH and GERMAN (For primary document see N85-27794 16-92)
Avail: Issuing Activity

Goals and objectives of the Helios project are reviewed. The experiments investigate the properties and processes in interplanetary space by approaching the Sun to 0.30 AU. Data obtained during the solar cycle contribute to the correlation required

for an adequate understanding of complex space phenomena.
Author (ESA)

N85-27796 Max-Planck-Inst. fuer Astronomie, Heidelberg (West Germany).
ZODIACAL LIGHT: A REPLICA OF THE INTERPLANETARY DUST CLOUD [ZODIAKALLICHT: EIN ABBILD DER INTERPLANETAREN STAUBWOLKE] c90
Christoph Leinert, Eckhart Pitz, and Hartmut Link *In* DFVLR Ten Years of Helios 1984 p 50-57 In ENGLISH and GERMAN Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

Zodiacal light was observed using the HELIOS space probe to determine whether the density of the dust increases toward the Sun or whether a rise in reflective properties makes the particles appear bright in the vicinity of the Sun. As far as comets as sources of dust are concerned, the search for a brightening in the Quadrantid meteor stream was not successful. This is understandable given that only larger particles survive in that stream; further measurements are necessary to confirm this assumption. The plane of symmetry of the dust distribution was determined by telescopes; it is concluded that the interplanetary dust particles are mainly affected by gravitational forces of the planets and not by electromagnetic effects. Over a time span of several years no variation of the zodiacal light intensity is observed within 2%. Stray light of huge plasma clouds indicates high solar activity during the peak period of the sunspot cycle. Author (ESA)

N85-27797 Max-Planck-Inst. fuer Kernphysik, Heidelberg (West Germany).
THE MICROMETEORITE EXPERIMENT ON HELIOS [DAS MIKROMETEORITENEXPERIMENT AUF HELIOS] c91
Eberhard Gruen, Hugo Fechtig, and Jochen Kissel *In* DFVLR Ten Years of Helios 1984 p 58-63 In ENGLISH and GERMAN Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

Dust particles (micrometeorites) were directly observed by Helios in the inner solar system. One of the two sensors in each of the two space probes looks in the direction of the ecliptic plane, the other is tilted to the south (Helios 1) or to the north (Helios 2). The experimental setup is constituted by a protective cover against solar wind and solar radiation, an impact ionization detector, and a time of flight mass spectrometer. The experiment is calibrated with dust particle accelerators. Several hundred micrometeorites are registered by the detectors on each of the space probes; their impact rates are determined. Particle orbit observations show that many particles run on hyperbolic orbits aiming out of the solar system; the origin of these particles could not be determined. The investigations of chemical composition and density of micrometeorites suggest two classes: chondritic particles relating to the more frequent stone meteorites, and iron-rich particles similar to iron meteorites. Author (ESA)

N85-27798 Max-Planck-Inst. fuer Aeronomie, Katlenburg-Lindau (West Germany).
TEN YEARS SOLAR WIND EXPERIMENTS ON HELIOS 1 AND HELIOS 2 [IO JAHRE SONNENWINDEXPERIMENT AUF HELIOS 1 UND 2]
Rainer Schwenn and Helmut Rosenbauer *In* DFVLR Ten Years of Helios 1984 p 66-79 Partly in GERMAN and ENGLISH Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

The Helios solar wind experiment is reviewed. The experiment measures low energy ions and electrons which run through an electrostatic or electrodynamic deflection system. A stepwise registration of energy spectra is performed, and the direction of particle arrival is also determined. Velocity distribution functions for the different particle species are used to deduce solar wind properties. The instruments operate without any major malfunctions. The long life of Helios 1 allowed it to collect a set of solar plasma data of almost identical quality over a full solar activity cycle. Author (ESA)

N85-27799 Cologne Univ. (West Germany). Inst. fuer Geophysik und Meteorologie.
RESULTS OF THE MAGNETIC FIELD EXPERIMENTS E2 AND E4 ONBOARD HELIOS 1 AND HELIOS 2 [ERGEBNISSE DER MAGNETFELDEXPERIMENTE E2 UND E4 AN BORD VON HELIOS 1 UND HELIOS 2]
F. M. Neubauer, G. Musmann (Technische Univ., Brunswick), and G. Dehmel (Technische Univ., Brunswick) *In* DFVLR Ten Years of Helios 1984 p 80-89 Partly in GERMAN and ENGLISH Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

A flux gate magnetometer (E2) and a search coil magnetometer (E4) were developed to investigate the interplanetary magnetic field. The E2 has a flipper mechanism, allowing the interchangeable calibration of the three-axis components of the magnetometer; the magnetic field experiment E2 observes slow variations of the interplanetary magnetic field up to 4Hz. The E4 is a magnetic antenna; its measuring range is up to 2.2 kHz. The observations of Helios 1 show the Archimedean spiral shape of the magnetic field structure. The radial field component decreases almost proportional to the square of the distance to the Sun; the azimuthal component decreases linearly. Different kinds of short period disturbances are superimposed on the overall structure of the solar wind; Alfven waves may strongly influence solar wind generation. The overall structure of interplanetary waves due to solar flares is determined, confirming theoretical assumptions.
Author (ESA)

N85-27800* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. Dept. di Phisica.
ROME/GODDARD SPACE FLIGHT CENTER (GSFC) MAGNETIC FIELD EXPERIMENT: A SUMMARY OF RESULTS c90
F. Mariani, N. Ness, B. Bavassano (CNR, Frascati, Italy), L. Burlaga, S. Cantarano (Aquila Univ., Italy), C. Scearce (NASA Goddard Space Flight Frascati, Italy), R. Terenzi (CNR, Maryland), and U. Villante (Aquila Univ., Italy) *In* DFVLR Ten Years of Helios-1984 p 90-99 Prepared in cooperation with Rome Univ. Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

A triaxial flux gate magnetometer (E3) was developed and operated to accurately measure the vector magnetic field onboard Helios 1 and 2. Observations of large-scale variations and sector structure confirm theoretical descriptions and compuations. Limits on the configuration of a magnetic cloud are set, and the source of at least one magnetic cloud is identified as a coronal mass ejection. Two types of interplanetary flow pattern are identified: a corotating stream and interaction region related to the boundary, and a transient flow associated with a shock wave. Discontinuities in the direction and/or strength of the magnetic field are explained. Alfven waves and magnetic turbulence are characterized by simultaneous Helios 1 and 2 observations. Author (ESA)

N85-27801 Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
PLASMA WAVES IN THE SOLAR WIND: TEN YEARS OF HELIOS OBSERVATIONS
D. A. Gurnett and R. R. Anderson *In* DFVLR Ten Years of Helios 1984 p 100-105 Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

Plasma waves in the solar wind were observed from the Helios spacecraft. The spacecraft was equipped with a 32 m tip-to-tip dipole antenna for the plasma waves electric field; the signals were analyzed by 3 instruments covering the frequency range from 10 Hz to 3 MHz. The production mechanism of solar radio burst is determined. A spectrum of electron plasma oscillation events is detected. The existence of enhanced levels of ion acoustic wave turbulence in the solar wind is revealed. Electron plasma oscillations associated with interplanetary shocks are

detected. The long duration of all these observations and the extended radial distance coverage provide a vast quantity of data on the temporal and radial variation of plasma wave phenomena over almost an entire solar cycle. Author (ESA)

N85-27802 Minnesota Univ., Minneapolis. School of Physics and Astronomy.
EVIDENCE CONCERNING THE GENERATION MECHANISM OF SOLAR TYPE 3 RADIO BURSTS
Paul J. Kellogs *In* DFVLR Ten Years of Helios 1984 p 106-110 ref Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

Type 3 bursts were studied by a Helios satellite radio receiver which was rapidly stepped through 168 different frequencies between 12 Hz and 203 kHz. The generation mechanism of an instability due to beams of energetic electrons, emitted from the surface of the Sun, which interact with the solar wind is explained. The resulting electrostatic waves generate radio waves. The Helios data suggest that the type 3 bursts are generated at the fundamental and the second harmonic plasma frequency. Unfortunately this means that the frequency of type 3 bursts cannot be used as a clear indication of the density of the interplanetary medium without other evidence as to whether in a given case the emission is at the fundamental or the second harmonic of the plasma frequency. Author (ESA)

N85-27803* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE HELIOS RADIO ASTRONOMY EXPERIMENT **c89**
Susan Kayser and Robert Stone *In* DFVLR Ten Years of Helios 1984 p 111-114 Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

Radio bursts traveling between the Sun and the Earth were tracked by radio astronomy experiments on Helios 1 and 2. A relatively short dipole antenna with a well-defined toroidal reception pattern was flown. The antenna spins in the ecliptic at 60.3 rpm and 2 frequencies are measured in each revolution. The signal analysis determines the strength of the signal, the direction of the source in the ecliptic, and the degree of modulation, and estimates source size. The experiments provide three-dimensional direction finding in space. They extend the radio frequency window beyond what is observable on Earth, and offer a long triangulation baseline. Author (ESA)

N85-27804 Ruhr Univ., Bochum (West Germany).
REMOTE SENSING OF THE PLASMA WITH TIME DELAY MEASUREMENTS (CORONAL SOUNDING) [PLASMA-FERNERKUNDUNG MIT LAUFZEITMESSUNGEN (KORONA-SONDIERUNG)]
Peter Edenhofer *In* DFVLR Ten Years of Helios 1984 p 115-117 Partly in GERMAN and ENGLISH Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

Sounding of the solar corona was performed in constellations where Helios was almost behind the Sun, seen from the Earth. The measurements came to within 63 solar radii Ro to the Sun; and are able to close the measuring gap between 3 and 60 to 70 Ro. The Helios 1 measurements are full of data gaps. The data quality (signal strength) and data quantity delivered by Helios 2 in combination with the Deep Space Network are excellent. The coronal electron density distribution is calculated from the measurements in a region where neither optical nor direct measurements are possible. Author (ESA)

N85-27805* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE FARADAY ROTATION EXPERIMENT [DAS FARADAY-ROTATIONS-EXPERIMENT]
H. Volland, G. S. Levy, M. K. Bird, C. T. Stelzried, and B. L. Seidel *In* DFVLR Ten Years of Helios 1984 p 118-121 Partly in GERMAN and ENGLISH Prepared in cooperation with Bonn Univ. Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

The magnetized plasma of the solar corona was remotely sounded using the Faraday rotation effect. The solar magnetic field together with the electrons of the coronal plasma cause a measurable Faraday rotation effect, since the radio waves of Helios are linearly polarized. The measurement is performed at the ground stations. Alfven waves traveling from the Sun's surface through the corona into interplanetary space are observed. Helios 2 signals penetrating through a region where coronal mass is ejected show wavelike structures. Author (ESA)

N85-27806 Kiel Univ. (West Germany). Inst. fuer Reine und Angewandte Kernphysik.
THE FAST INDIVIDUALISTS IN THE SOLAR SYSTEM: COSMIC RAYS [DIE SCHNELLEN INDIVIDUALISTEN IM SONNENSYSTEM]
Horst Kunow and Gerd Wibberenz *In* DFVLR Ten Years of Helios 1984 p 124-148 Partly in GERMAN and ENGLISH Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

Solar cosmic rays were investigated onboard Helios. Phenomena related to the measurements of energetic particles are presented. The measurements of cosmic rays between Sun and Earth show the dominant influence of the Sun on the whole solar system. Long term variations of the cosmic rays are related to the sunspot cycle. At many locations in the heliosphere acceleration processes of rays are observed; solar flares are the most effective acceleration process. In the acceleration region in the solar atmosphere the plasma densities are high, the dimensions of magnetic field structures are small, and the energy involved is high. In interplanetary space, plasma densities are much smaller, magnetic field structures are very large, and the energy densities at the location of acceleration are low. Origin and propagation of cosmic rays depend on the environmental conditions, e.g., the state of the plasma, the plasma waves, and magnetic fields at the source and along the way to the observer. Author (ESA)

N85-27807* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RESULTS FROM THE HELIOS GALACTIC AND SOLAR COSMIC RAY EXPERIMENT (E7)
James H. Trainor, Michelle A. I. vanHollebeke, Nand Lal, and Frank B. McDonald *In* DFVLR Ten Years of Helios 1984 p 149-155 Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

Energy spectra, charge composition, and flow patterns of solar and galactic cosmic rays were investigated using three nuclear-particle telescopes on Helios to measure electrons (50 keV to 8 MeV) protons (100 eV to 800 MeV) alpha particles (to 600 MeV per nucleon) heavier elements up to neon, (to 200 MeV per nucleon). The experiment includes a proportional counter to monitor solar X-rays in the range 2 to 8 keV. A collection of solar flare associated particle events are observed whereby coronal effects and spatial distribution of flare particles are determined over almost a whole solar cycle; a typical solar particle events are also observed. Earlier explanations concerning corotating energetic particle streams in the inner and outer solar system are confirmed. Solar modulation of galactic cosmic rays is identified. Gamma ray bursts are detected and the sources in the sky are precisely determined, proving the suspected galactic origin. Author (ESA)

N85-27808 Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
THE SIGNIFICANCE OF HELIOS FOR EUROPE [DIE BEDEUTUNG VON HELIOS FUER EUROPA] **c84**
Ants Kutzer *In* DFVLR Ten Years of Helios 1984 p 159-161 In ENGLISH and GERMAN (For primary document see N85-27794 16-92)
Avail: Issuing Activity

The impact of the international cooperative satellite project Helios on Europe is described. The industrial effort was spread over a large number of contractors in several countries. The project exercised firm management control over the participating parties, while simultaneously assuring a degree of openness and communication among all participating groups. Highly skilled professional personnel was trained. The Helios mission was significant for German ground operations. Important technical and managerial achievements are obtained. More than 20 projects benefitted from the transfer of processes, materials, techniques, technological advances and/or spin-offs, as well as from managerial procedures and methodologies first used in Europe on Helios.
Author (ESA)

N85-27809 Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
MANAGERIAL BENEFITS OF HELIOS FOR THE EUROPEAN INDUSTRY [GEWINN AN MANAGEMENTFAEHIGKEITEN DURCH HELIOS FUER DIE EUROPAETISCHE INDUSTRIE] c81
Ants Kutzer and Bernd-J. Madauss *In* DFVLR Ten Years of Helios 1984 p 162-171 In ENGLISH and GERMAN Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

The benefits of the Helios project management procedures and methods for European industry are described. The know-how gained by cooperation in working groups and reviews, and the Helios project procedures and methodologies, now standard management tools in Europe, are presented. Project organization, specification system, work breakdown structure, project scheduling, action item control, project review, and career achievements of Helios personnel are described. Author (ESA)

N85-27810 Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
THE TECHNOLOGICAL GAINS OF HELIOS FOR THE EUROPEAN INDUSTRY [DER TECHNISCHE NUTZEN VON HELIOS FUER DIE EUROPAEISCHE INDUSTRIE] c81
Victor Billig *In* DFVLR Ten Years of Helios 1984 p 172-179 In GERMAN and ENGLISH (For primary document see N85-27794 16-92)
Avail: Issuing Activity

The technological benefits which accrued to European industry in designing, building, testing, and launching the Helios satellites are presented. The activities from project go-ahead until the second satellite was safely in orbit provided a wealth of exchange and technological benefits to industry. Author (ESA)

N85-27811 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).
HELIOS GROUND OPERATIONS [HELIOS-BODENBETRIEB] c14
Joachim Kehr and Georg Hiendlmeier *In its* Ten Years of Helios 1984 p 183-188 In ENGLISH and GERMAN Original contains color illustrations (For primary document see N85-27794 16-92)
Avail: Issuing Activity

The ground station support of Helios is described. The real time control operation is presented. It is explained how the control center succeeded in repairing serious malfunctions onboard Helios 1 and 2. In the primary mission phases an almost continuous data stream at the highest time resolution was available via radio astronomy stations. Later on the number and extent of data gaps increased, and ground station support was comparatively poor.
Author (ESA)

N85-27812 European Space Agency. European Space Operations Center, Darmstadt (West Germany).
HELIOS PROJECT SUPPORT c81
Kurt Jeftman *In* DFVLR Ten Years of Helios 1984 p 189-192 In ENGLISH and GERMAN (For primary document see N85-27794 16-92)
Avail: Issuing Activity

The way in which the Jet Propulsion Laboratory supported the Helios project is described. The preparation procedures for operations are explained. The tracking coverage during the flight operations is described. The spacecraft performance exceeded expectations. Author (ESA)

N85-27813*# Wisconsin Univ., Madison.
THE SOFT X-RAY BACKGROUND AS A SUPERNOVA BLAST WAVE VIEWED FROM INSIDE: SOLAR ABUNDANCE MODELS
Richard J. Edgar [1984] 39 p refs
(Grant NGL50-002-044)
(NASA-CR-175767; NAS 1.26:175767) Avail: NTIS HC A03/MF A01 CSCL 03B

A model of the soft X-ray background is presented in which the Sun is assumed to be inside an active supernova blast wave. The blast wave evolves in a preexisting cavity. The broad band surface brightnesses is explained by such a blast wave with an explosion energy of E sub approx.> 5 x 10 to the 50th power ergs and radius 80 to 100 pc, using solar abundances. An approach to treating the problem of large anisotropies in the ambient medium is also explored, accommodating the observed anticorrelation between the soft X-ray surface brightness and the 21 cm column density. It is found that only for post shock temperatures below 10 6 K a shock propagating into a density enhancement will be dimmer than a similar shock in a lower density region.
E.A.K.

N85-27814# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
STUDY OF THE DEGRADATION OF SHORT-CIRCUIT CURRENT AND THE OPEN-CIRCUIT TENSION OF SPATIAL SOLAR CELLS AS A FUNCTION OF THE FLUENCY OF 1MeV ELECTRONS [ESTUDO DA DEGRADACAO DA CORRENTE DE CURTO CIRCUITO E TENSAO DE CIRCUITO ABERTO DE CELULAS SOLARES DE QUALIFICACAO ESPACIAL EM FUNCAO DA FLUENCIA DE ELETRONS DE 1MEV]
Nelson Veissid Dec. 1984 33 p refs In PORTUGUESE; ENGLISH summary Presented at the Simp. Brasileiro de Microelectronica (INPE-3356-PRE/634) Avail: NTIS HC A03/MF A01

Results of a study of the degradation of short circuit current and the tension of open circuitry of spatial solar cells as a function of the fluency of 1 MeV electrons are presented. The theory of the degradation of solar cells by ionizing radiation is discussed as it relates to the diminution of the length of diffusion and variations in short circuit current and open circuit tension by irradiation. Parameters were determined which could be adjusted as curves of I sub SC and V sub OC, as a function of the fluency of 1 MeV electrons, and spatial solar cells (type n/p) with and without a retrosuperficial electrical field and retroreflector contact. A double exponential model and iterative methods were used which permitted the determination of the values of series resistance, saturation current of the mechanism of diffusion, and saturation current of the recombination process. An empiric equation is proposed for the degradation of V sub OC by solar cell irradiation with retroreflector contact. Transl. by B.G.

N85-27815# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A SYNCHROTRON/INVERSE COMPTON INTERPRETATION OF A SOLAR BURST PRODUCING FAST PULSES AT LAMBDA' > 3 mm AND HARD X-RAYS
P. Kaufmann, E. Correia, J. E. R. Costa, and A. M. Zodi Vaz Dec. 1984 28 p refs Submitted for publication Sponsored in part by FINEP
Avail: NTIS HC A03/MF A01

The recently discovered new class of solar burst emission component exhibiting very fast pulses (durations approx 60 ms) at mm waves (lambda approx. < mm) and at hard X-rays, poses serious constraints for interpretation assuming the acceleration of low energy electrons. An alternative interpretation is suggested assuming that the mm-wave emission component is part of a synchrotron radiation spectrum with peak emission in the infrared range of frequencies and accounting for fluxes reported for white-light flare emission in the visible range. Electron energies

are reduced primarily by inverse Compton quenching on the synchrotron source photons, producing the observed X-rays and explaining the pulses' short time scales. According to this interpretation, the burst pulse sources must be very small (approx. 10 to the 6th power cm) with high brightness temperatures (approx. 10 the the 10th power 1 K). In a following step of the fast pulse, for t approx. > 60 ms, the electrons energies decay to mildly relativistic or thermal energies, which may produce the better known longer lasting (t approx. 10 to the 6th power 60 ms) emissions at microwaves and X-rays. B.W.

N85-27816# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MICROWAVES AND HARD X-RAYS ULTRAFAST TIME STRUCTURES AT THE IMPULSIVE PHASE OF SOLAR BURSTS
P. Kaufmann Mar. 1985 14 p refs Presented at the 4th IAU Reg. Meeting, Rio de Janeiro, Nov. 1984 Submitted for publication
(INPE-3478-PRE/721) Avail: NTIS HC A02/MF A01

Recent results on ultrafast time structures observed at microwaves and hard-X-rays in the impulsive phase of solar bursts are briefly reviewed in terms of diagnostics and the implications for the interpretation of accelerating mechanisms. Author

N85-27817# Tufts Univ., Medford, Mass. Dept. of Physics.
VERY LARGE ARRAY OBSERVATIONS OF CORONAL LOOPS AND RELATED OBSERVATIONS OF SOLAR TYPE STARS Annual Scientific Report, 1 Jan. - 31 Dec. 1984
K. R. Lang 29 Jan. 1984 118 p
(Grant AF-AFOSR-0019-83)
(AD-A152027; AFOSR-85-0256TR) Avail: NTIS HC A06/MF A01 CSCL 03/2

Observations of solar active regions with the Very Large Array (V.L.A.) led to a new understanding of the origin and prediction of the solar bursts which disrupt communication systems and interfere with high-flying aircraft. The V.L.A. was used to delineate the temperature and magnetic structure at different heights in coronal loops, and the magnetic field strength was also determined. Much of the visible solar disk was resolved at 20 cm wavelength with 2.6 in. angular resolution. Snapshot maps at intervals of 3 seconds were used to specify changes in the temperature and the magnetic field before and during solar bursts. These snapshot maps were used to investigate the flow of plasma within coronal loops during solar bursts. Postflare loop systems were similarly investigated. Our V.L.A. observations provided new information on coronal heating and emerging magnetic loops that may trigger the emission of solar bursts. GRA

N85-27818# National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.
SOLAR ACTIVITY MONITORING SATELLITE (SAMSAT): IMPACT ON SPACE ENVIRONMENT SERVICES
W. J. Wagner and G. R. Heckman Jan. 1985 46 p refs
(PB85-165066; NOAA-TM-ERL-SEL-69) Avail: NTIS HC A03/MF A01 CSCL 03B

The national needs for space environment services are shown to require enhanced monitoring of the Sun and solar wind. Various avenues to improvements in current remote sensing systems are available; one of the more promising is the U.S. Air Force concept of a dedicated solar activity monitoring satellite (SAMSAT). The current products of space environment services are reviewed and the mutual interest and history of cooperation between the NOAA Space Environment Laboratory and the Air Force are noted. Arguments are advanced for the utility of SAMSAT prime instruments such as an X-ray Imager, a Coronal Mass Ejection Monitor, and a Vector Magnetograph in supporting the NOAA and Air Force missions. GRA

N85-27819# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 484, DECEMBER 1984. PART 1 (PROMPT REPORTS): DATA FOR NOVEMBER 1984, OCTOBER 1984 AND LATE DATA
Helen E. Coffey, ed. and Carol Weathers, ed. Feb. 1984 94 p
(NASA Order W-15519; Grant NSF ATM-83-1491)
(NASA-CR-175829; NAS 1.26:175829; PB85-166593; SGD-484-Pt-1; LC-79-640375; ISSN-0038-0911) Avail: NTIS HC A05/MF A01 CSCL 03B

Solar geophysical data are reported. The following topics are included: detailed index for 1984; data for November 1984-(UWDS alert periods (Advance and Worldwide), solar activity indices, solar flares, solar radio emission, inferred interplanetary magnetic field polarity graph, mean solar magnetic field); data for October 1984-(solar active regions, sudden ionospheric disturbances, solar radio spectral observations, cosmic ray measurements by neutron monitor, geomagnetic indices, radio propagation indices); late data-(solar radio spectral data bleien for September 1984, geomagnetic indices September 1984, cosmic rays June - September 1984 Climax/Huancayo). GRA

N85-27820*# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 484, DECEMBER 1984. PART 2 (COMPREHENSIVE REPORTS): DATA FOR JUNE 1984, JANUARY 1982 AND MISCELLANEA
Helen E. Coffey, ed. Feb. 1984 67 p
(NASA Order W-15519; Grant NSF ATM-831491)
(NASA-CR-175826; NAS 1.26:175826; PB85-166601; SGD-484-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 03B

The following topics are included: Meudon carte synoptique; solar radio bursts at fixed frequencies; interplanetary solar particles and plasma; solar X-ray radiation from GOES satellite; mass ejections from the Sun; active prominences and filaments); solar flares January 1982, and number of flares August 1966 – January 1982. Author

N85-26776# Joint Publications Research Service, Arlington, Va.
SATELLITE RESEARCH ON SOLAR FLARES Abstract Only
Zh. Manilova and Grant Yegorovich Kocharov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 5 Transl. into ENGLISH from Leningradskaya Pravda (Leningrad), 27 Jan. 1985 p 4 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26794# Joint Publications Research Service, Arlington, Va.
INSTABILITY OF SOLAR WIND NEAR STREAMLINED BODIES Abstract Only
I. S. Veselovskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 19 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 705-708 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26795# Joint Publications Research Service, Arlington, Va.
GEOPHYSICAL RESPONSES OF DYNAMICS OF SOLAR WIND TRANSITION REGION Abstract Only
N. A. Lotova and V. D. Kozlovskiy *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 19-20 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 709-713 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26806# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF SHORT-PERIOD CHANGES IN INTENSITY OF HARD X-RADIATION OF SOLAR FLARES REGISTERED ABOARD VERNERA-13 AND VENERA-14 SPACECRAFT Abstract Only
S. V. Bogovalov, A. F. Iyudin, Yu. D. Kotov, Ye. V. Shugal, V. Sh. Dolidze, V. M. Zenchenko, G. Vedrenne, M. Niel, C. Barat, C. Shambon et al *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 31 Transl. into ENGLISH from Pisma v Astron. Zh. (Moscow), v. 10, no. 9, Sep. 1984 p 685-690 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-27298*# Texas Univ., Austin. Center for Space Research.
NUMERICAL INTEGRATION THROUGH FORCE DISCONTINUITIES: SOLAR RADIATION PRESSURE
In NASA. Goddard Space Flight Center Topex Gravity Model

Develop. Team Activities During Fiscal Year 1984 Apr. 1985 18 p (For primary document see N85-27285 16-42)
(Contract JPL-956689)
Avail: NTIS HC A14/MF A01 CSCL 03B

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N85-26791# Joint Publications Research Service, Arlington, Va.
PERIODICITY OF VARIATIONS IN GALACTIC COSMIC RAY FLUXES AND SOLAR ACTIVITY PARAMETERS NEAR 20TH CYCLE MINIMUM Abstract Only
Ye. V. Gorchakov, P. P. Ignatyev, V. P. Okhlopkov, and T. Ye. Shvidkovskaya *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 16-17 Transl. into ENGLISH from Kosm. Issled. (Moscow), v. 22, no. 3, May-Jun. 1984 p 432-439 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26796# Joint Publications Research Service, Arlington, Va.
VARIATIONS IN INTENSITY OF SECONDARY COSMIC RADIATION OBSERVED ON 10-11 AUGUST 1981 Abstract Only
A. F. Iyudin, V. A. Kaplin, V. G. Kirillov-Ugryumov, Yu. D. Kotov, Yu. V. Smirnov, V. G. Tyshkevich, and V. N. Yurov *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 20 Transl. into ENGLISH from Geomagn. i. Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 719-722 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26800# Joint Publications Research Service, Arlington, Va.
MEASUREMENTS OF FLUXES OF HIGH-ENERGY PROTONS AND ELECTRONS BY 2 OPPOSITELY ORIENTED SPECTROMETERS ABOARD COSMOS-368 ARTIFICIAL EARTH SATELLITE Abstract Only
L. S. Bratolyubova-Tsulukidze, N. N. Volodichev, O. Yu. Nechayev, I. A. Savenko, A. A. Suslov, and P. I. Shavrin *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 23 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 812-813 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

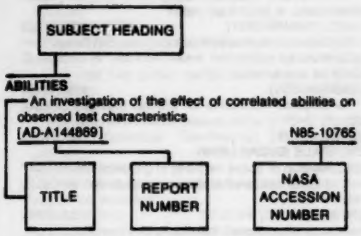
N85-26801# Joint Publications Research Service, Arlington, Va.
BURSTS OF RELATIVISTIC ELECTRONS IN MAGNETOPAUSE AND IN OUTER RADIATION BELT Abstract Only
I. P. Bezrodnykh, Ye. G. Berezhko, Ye. I. Morozova, N. F. Pisarenko, I. Ya. Plotnikov, and Yu. G. Shafer *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 24 Transl. into ENGLISH from Geomagn. i Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 818-820 Original language doc. was announced in IAA as A85-14545 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

N85-26802# Joint Publications Research Service, Arlington, Va.
CORRELATED FLUCTUATIONS OF CHARGED PARTICLE FLUXES AND MAGNETIC FIELD ACCORDING TO DATA FROM INTERCOSMOS-10 SATELLITE Abstract Only 2tra Transl. into ENGLISH from Geomagn. I Aeron. (Moscow), v. 24, no. 5, Sep.-Oct. 1984 p 821-823
G. A. Glukhov, Yu. P. Kratenko, S. N. Kuznetsov, and Yu. V. Mineyev *In its* USSR Rept.: Space (JPRS-USP-85-004) 6 May 1985 p 24-25 Original language doc. was announced in IAA as A85-14546 (For primary document see N85-26772 16-12)
Avail: NTIS HC A06

99 GENERAL

No abstracts in this category.

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

A-310 AIRCRAFT
Statistical study of the dynamic analysis of the workload in the A310 certification campaign N85-27531
ABSORPTANCE
Thermal consequences of localized SAR from RFR exposures N85-27130
ABSORPTION CROSS SECTIONS
Tables of nuclear cross sections for galactic cosmic rays: Absorption cross sections
[NASA-RP-1134] N85-27665
ABSORPTION SPECTRA
A measurement of the vibrational band strength for the upsilon sub 3 band of the HO2 radical
[NASA-CR-175858] N85-26936
An atlas of pure water vapor spectra from 500 to 5000/cm, Volume 2
[AD-A151757] N85-26940
Effects of temperature on remotely sensed mafic mineral absorption features N85-27323
ABSTRACTS
A summary of the Naval Postgraduate School research program
[AD-A151721] N85-27738
Compilation of abstracts of theses submitted by candidates for degrees
[AD-A151722] N85-27739
Summary of Research, Academic Departments, 1983 - 1984
[AD-A151724] N85-27741
ACCELERATION (PHYSICS)
Empirical development of ground acceleration, velocity and displacement for accidental explosions at J5 or the proposed large altitude rocket cell at Arnold Engineering Development Center
[DE85-006324] N85-27020
Acceleration resistant combination of opposite-handed piezoelectric crystals
[AD-D011626] N85-27143
Acceleration-resistant crystal resonator
[AD-D011627] N85-27144
Acceleration sensitivity reduction method
[AD-D011631] N85-27146
ACCELERATION PROTECTION
Improving inflight negative Gz restraint for aircrewmen
[AD-A151909] N85-26868
ACCELEROMETERS
Preguidance and piloting with the aid of composite inertial sensors N85-26848
Low cost two gimbal inertial platform and its system integration N85-26861
Simulation of a low orbit restitution. Covariance analysis of the position-velocity by Doppler and accelerometer measurements
[CNES-CT/DTI/MS/AE/166] N85-26836
Research and development of subsurface acoustic wave devices for sensor applications
[AD-A152197] N85-27642
ACCEPTABILITY
Development of acceptance criteria for batches of silane primer for external tank thermal protection system bonding applications
[NASA-CR-175850] N85-26995
ACCESS CONTROL
Access path optimization for network database retrieval N85-27749
ACCOUNTING
Management control systems and interdependencies: An empirical study
[AD-A152280] N85-27746
ACCRETION DISKS
A numerical study of nonspherical black hole accretion N85-27780
ACCURACY
Accuracy of the calculated stress field around a craze
[DE85-005520] N85-27272
Optimal relative data weights N85-27296
Studies into location accuracy — ARGOS system N85-27334
Evaluation of the PROFS (Program for Regional Observing and Forecasting Services) 1982, real-time forecast experiment
[PB85-159747] N85-27495
ACID RAIN
Emission inventory applications to regional acid deposition modeling
[PB85-157366] N85-27033
Interactive effects of acid rain and gaseous air pollutants on natural terrestrial vegetation
[DE85-005255] N85-27401
Acid rain: Effects on fish and wildlife
[PB85-154672] N85-27402
Acid precipitation in North America: 1980, 1981 and 1982 annual data summaries from acid deposition system data base
[PB85-162477] N85-27410
Acid rain: Towards automated monitoring N85-27444
ACOUSTIC ATTENUATION
Interaction of finite-amplitude sound with air-filled porous materials
[NASA-CR-174885] N85-27637
ACOUSTIC EMISSION
Contribution to the study of equivalent noise source identification in fast cold jets
[ISL-R-114/83] N85-27645
ACOUSTIC IMPEDANCE
Interaction of finite-amplitude sound with air-filled porous materials
[NASA-CR-174885] N85-27637
ACOUSTIC MEASUREMENT
Development of a modified time delay spectrometry technique for underwater acoustic measurements in a multipath environment
[AD-A152111] N85-27639
Experimental investigation of the pulsed photoacoustic effect produced on a solid surface
[AD-A152114] N85-27640
Measurement of cochlear acoustic pressure in guinea pigs
[ISL-CO-234/83] N85-27644
ACOUSTIC PROPAGATION
Acoustic propagation in a thermally stratified atmosphere
[NASA-CR-175787] N85-27636
ACOUSTIC PROPERTIES
Phase-lock fiber optic interferometer
[AD-D011603] N85-27191
ACOUSTICS
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26842
Phase-lock fiber optic interferometer
[AD-D011603] N85-27191
ACOUSTO-OPTICS
The development and implementation of an optical communications laboratory
[AD-A151682] N85-27111
Acousto-optical spectrometers at Itapetinga Radio Observatory
[INPE-3479-PRE/722] N85-27776
ACTIVATED CARBON
Low pressure storage of methane on interlayered clays for potential vehicular applications
[DE85-006949] N85-27017
ACTIVE CONTROL
Technical evaluation report on the Flight Mechanics Symposium on Active Control Systems: Review, Evaluation and Projections
[AGARD-AR-220] N85-26730
Active control technology: Past, present, future N85-26731
The state-of-the-art and future of flight control systems N85-26732
A perspective on superaugmented flight control advantages and problems N85-26733
Aspects of application of ACT systems for pilot workload alleviation N85-26734
Application of AFTI/F-16 task-tailored control modes in advanced multirole fighters N85-26735
X-29A digital flight control system design N85-26736
The evaluation of ACS for helicopters: Conceptual simulation studies to preliminary design N85-26737
ACT applied to helicopter flight control N85-26738
An update on experience on the fly by wire Jaguar equipped with a full-time digital flight control system N85-26740
ACT flight research experience N85-26741
Operational and developmental experience with the F/A-18A digital flight control system N85-26742
OLGA: An open loop gust alleviation N85-26744
Active control technology experience with the Space Shuttle in the landing regime N85-26747
The aerodynamics of controls N85-26748
Active control landing gear for ground loads alleviation N85-26749
Wing buffeting active control testing on a transport aircraft configuration in a large sonic tunnel N85-26750
How to handle failures in advanced flight control systems of future transport aircraft N85-26752
The certification of airborne complex digital systems N85-26754
Automatic flight control modes for the AFTI/F-111 mission adaptive wing aircraft N85-26756
The evolution of active control technology systems for the 1990's helicopter N85-26758
ACTUATORS
Surveillance program for the dissection and analysis of explosive and pyrotechnic components
[DE85-006105] N85-27016
ADA (PROGRAMMING LANGUAGE)
Reusable software: A concept for cost reduction N85-26655
Evaluation of Ada (trademark) as a communications programming language, volume 1
[AD-A152314] N85-27559
Evaluation of Ada (trademark) as a communications programming language. Volume 2: Communications protocols application
[AD-A152315] N85-27560

Evaluation of Ada (trademark) as a communications programming language. Volume 3: Trusted software application
[AD-A152316] N85-27561

ADAPTIVE CONTROL
Algorithms for determining the relative complexity of dynamic signals
[BLL-M-36111-(5828.4)] N85-27574

ADDITIVES
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967

ADHESION TESTS
An improved torsional method for determining the fracture toughness of stiff materials and of adhesive joints
[AD-A152091] N85-27267

ADHESIVE BONDING
Bond test data acquisition and analysis system
[DE85-007021] N85-27158

ADHESIVES
Development of a polystyrene insulation system
[DE85-006950] N85-27180

ADSORPTION
Experimental testing of cooling by low pressure adsorption in a zeolite
[DE85-007509] N85-26763

ADVECTION
Fog advection in the Namib N85-27454

AERIAL PHOTOGRAPHY
Identification of structure of soil-vegetation cover using aerial and space photographs N85-26826
Diffusion coefficients for coastal water determined from aerial photographs
[INPE-3413-PRE/679] N85-27331
Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms
[INPE-3359-PRE/637] N85-27545

AERODYNAMIC BALANCE
Dispersion sensitivity of the eight inch advanced ramjet munitions technology projectile due to wind and minor thrust errors
[AD-A152145] N85-26835

AERODYNAMIC CHARACTERISTICS
Numerical analyses in aerodynamic design of aero-engine fan N85-26618
Low Reynolds number vehicles
[AGARD-AG-288] N85-26666
Rotor blade flap-lag stability and response in forward flight in turbulent flows N85-26698
Low-speed aerodynamic test of an axisymmetric supersonic inlet with variable cowl slot
[NASA-TM-87039] N85-26710
OLGA: An open loop gust alleviation N85-26744
The aerodynamics of controls N85-26748
Observations, theoretical ideas and modeling of turbulent flows: Past, present and future
[NASA-TM-86679] N85-27167
Analyses of orderly structures in jets and the relationship with emitted noise
[ISL-R-117/83] N85-27646

AERODYNAMIC COEFFICIENTS
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-3, 220/May-June
[ESA-TT-862] N85-26636
Measurements of the symmetric aerodynamic coefficients for flat faced cylinders in the angle of attack regime 0 to 90 deg for transonic and supersonic speeds
[FFA-TN-1984-04] N85-26675

AERODYNAMIC CONFIGURATIONS
Computational aerodynamics in designing aircraft N85-26622
Numerical example of three-dimensional flying object in shockless transonic flow N85-26623
Navier-Stokes solution of hypersonic blunt-nosed body flowfields N85-26624
Recent progress in computational aerodynamics N85-26626
Computational aerodynamics for aircraft wing design N85-26627
Comparison of computational results of a few representative three-dimensional transonic potential flow analysis programs N85-26628
A numerical design method for three-dimensional transonic wings N85-26631
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 1: User's manual
[AD-A152268] N85-26725
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 2: Final report on program enhancement and delivery
[AD-A152269] N85-26726
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 1: Program compilation
[AD-A152270] N85-26727
The evaluation of ACS for helicopters: Conceptual simulation studies to preliminary design N85-26737

AERODYNAMIC DRAG
A computer program for the drag prediction of subsonic, turbine powered aircraft in the en-route configuration
[VTH-LR-412] N85-26681
Atmospheric density model N85-27297

AERODYNAMIC FORCES
Application of CFD techniques toward the validation of nonlinear aerodynamic models
[NASA-TM-86715] N85-26671
Preliminary wind tunnel study of the influence of a jet on the unsteady aerodynamics of a turbojet engine
[ONERA-RT-12/5115-RY-230-R-231G] N85-26679
Flow around rotating and nonmoving circular cylinder near flat screen. Report 1: Aerodynamic forces in cylinder N85-27059
Aerodynamic forces developing in channels between vases in turbine drive wheels N85-27062

AERODYNAMIC HEATING
Navier-Stokes solution of hypersonic blunt-nosed body flowfields N85-26624

AERODYNAMIC INTERFERENCE
An experimental and analytical study of the aerodynamic interference effects between two Sears-Haack bodies at Mach 2.7
[NASA-TM-85729] N85-26673
Synthesis study: Validation of a gust generator in the presence of a model in a wind tunnel
[ONERA-RT-16/5108-RY-051] N85-26678

AERODYNAMIC LOADS
Description of a computer program treating transonic steady state aeroelastic effects for a canard or tail airplane
[FFA-TN-1983-23] N85-26674
The effect of load factor on aircraft handling qualities
[AD-A152118] N85-26724
Application of AFTI/F-16 task-tailored control modes in advanced multirole fighters N85-26735
Some flight test results with redundant digital flight control systems N85-26739
Study of stresses on surface of flat barrier immersed in under expanded jet of rarefied gas N85-27061

AERODYNAMIC NOISE
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-3, 220/May-June
[ESA-TT-882] N85-26636

AERODYNAMIC STABILITY
Aerodynamic detuning analysis of an unstalled supersonic turbofan cascade
[NASA-TM-87001] N85-26670
Optimum parameters of aerogyroscopic satellite orientation system N85-26782
Dynamic and aeroelastic action of guy cables
[VTT-18] N85-27276

AERODYNAMIC STALLING
Preliminary airworthiness evaluation of a National Aeronautics and Space Administration automated stall warning system for an OV-1 aircraft
[AD-A152010] N85-26708

AERODYNAMICS
A perspective on superaugmented flight control advantages and problems N85-26733
Wind energy technology program summary
[DE85-007349] N85-27392
Adaptive grid generation for numerical solution of Burger's equation
[AD-A152217] N85-27606
Research and development. Technical and scientific reports 1984 N85-27724
New flow physical aspects in aerodynamics
[MBB-FE-122/S/PUB/133] N85-27725

AEROELASTICITY
Description of a computer program treating transonic steady state aeroelastic effects for a canard or tail airplane
[FFA-TN-1983-23] N85-26674
Dynamic and aeroelastic action of guy cables
[VTT-18] N85-27276

AEROLOGY
Lightweight aerological radiosonde MARZ N85-27309

AERONAUTICAL ENGINEERING
Activities of the Aeronautics and Space Engineering Board
[NASA-CR-175825] N85-26610
Alternatives for jet engine control
[NASA-CR-175832] N85-26714
Alternatives for jet engine control
[NASA-CR-175833] N85-26715
Guide for the execution of reliability tests in the laboratory — aeronautical equipment N85-27237

AERONOMY
Atmospheric chemistry
[INPE-3190-PRE/554] N85-27430

AEROSOLS
French and West German equipment for Vega Project N85-26805
SAM II measurements of the polar stratospheric aerosol. Volume 6: April to October 1981
[NASA-RP-1141] N85-27422
Atmospheric radon measurements in the Antarctic Penninsula: A preliminary report
[INPE-3398-PRE/667] N85-27436
Evolution of stratospheric aerosol size distribution from ground-based radiometric measurements: A study of El Chichon aerosol
[DE85-007555] N85-27439
Geophysical monitoring for climatic change, number 12
[PB85-172278] N85-27496

AEROSPACE ENGINEERING
Application of space methods in geodesy N85-26817
A study of spaceraft technology and design concepts, volume 1
[NASA-CR-172579-VOL-1] N85-26844
A study of spacecraft technology and design concepts. Volume 2: Appendices
[NASA-CR-172579-VOL-2] N85-26845
Space Station Engineering and Technology Development
[NASA-CR-175806] N85-26851
Space Station Spartan study
[NASA-TM-86215] N85-26852

AEROSPACE ENVIRONMENTS
Research on zero-gravity botany apparatus N85-26811
Forecasts on long-range development of space programs N85-26830
Solar activity monitoring satellite (SAMSAT): Impact on space environment services
[PB85-165066] N85-27818

AEROSPACE INDUSTRY
Characteristics and applications of superplastic materials for aeronautics
[MBB-BB-565/84-O] N85-27727
Managerial benefits of Helios for the European industry N85-27809
The technological gains of Helios for the European industry N85-27810

AEROSPACE MEDICINE
Aerospace medicine and biology: A continuing bibliography with indexes, supplement 271, May 1985
[NASA-SP-7011(271)] N85-27514

AEROSPACE SYSTEMS
Application of space methods in geodesy N85-26817
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26965

AEROSPACE TECHNOLOGY TRANSFER
Symbiosis between postgraduate training and research projects: A successful experience
[INPE-3216-PRE/569] N85-27330
The technological gains of Helios for the European industry N85-27810

AGING (MATERIALS)
Characterization-curing-property studies of HBRF 55A resin formulations
[NASA-CR-175836] N85-26989
Damage caused to polyurethane foams by aging, simulated sunlight exposure, heat and fire
[AD-A152040] N85-26998

AGRICULTURE
Function of remote sensing in Brazil
[INPE-3314-PRE/621] N85-27329
Symposium on Atmospheric Sciences in South Africa
[CSIR-S-331] N85-27442
A weather service for agriculture N85-27450
Genetic engineering of plants: Agricultural research opportunities and policy concerns
[DE85-006771] N85-27513
Preliminary technology utilization assessment of the robotic fruit harvester
[NASA-CR-175834] N85-27532

AIR
Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935

AIR CURRENTS
Radon concentration inversion in the troposphere: Still unexplained
[INPE-3360-PRE/638] N85-27431

AIR DUCTS
A numerical procedure on three-dimensional parabolic flow in duct N85-26620

AIR FLOW
Air flow of the western coastal boundary of South Africa and its influence on the ocean N85-27459

AIR INTAKES
Low-speed aerodynamic test of an axisymmetric supersonic inlet with variable cowl slot
[NASA-TM-87039] N85-26710
AIR JETS
Study of stresses on surface of flat barrier immersed in under expanded jet of rarefied gas N85-27061
AIR LAND INTERACTIONS
Theory and modeling of the interaction between subgrid scale orography and large scale flow
[DM-43] N85-27440
AIR NAVIGATION
Terrain following without use of forward looking sensors N85-26659
Low cost two gimbal inertial platform and its system integration N85-26661
AIR POLLUTION
Analytical methods for determination of POHC (Principal Organic Hazardous Constituents) in combustion products
[PB85-161578] N85-26955
Emission inventory applications to regional acid deposition modeling
[PB85-157386] N85-27033
Interactive effects of acid rain and gaseous air pollutants on natural terrestrial vegetation
[DE85-005255] N85-27401
Acid rain: Effects on fish and wildlife
[PB85-154672] N85-27402
Review of national emission standards for mercury
[PB85-153906] N85-27406
Utilization of remote sensing data in the evaluation of air pollution characteristics in the south coast/Southeast Desert Air Basin
[PB85-162063] N85-27407
Symposium on Atmospheric Sciences in South Africa
[CSIR-S-331] N85-27442
Elemental analysis of aerosols in Transvaal urban and power-producing areas using time and size-resolved samples N85-27443
A wind-bivane/microprocessor system for on-line prediction and display of pollutant distributions N85-27449
Effect of traffic and meteorology on air pollution N85-27452
Ground-based remote sensing of atmospheric pollution N85-27462
AIR QUALITY
Air quality benefit analysis for Los Angeles and San Francisco based on housing values and visibility
[PB85-166049] N85-27409
AIR SAMPLING
Acid rain: Towards automated monitoring N85-27444
SCPP (Sierra Cooperative Pilot Project) data collection and analysis. Volume 1: Executive summary
[PB85-156065] N85-27494
AIR TO SURFACE MISSILES
Cost-effective missile guidance through distributed architecture and standard processes N85-26662
AIR TRAFFIC CONTROL
Wind modelling for increased aircraft operational efficiency N85-26652
National Airspace System Plan: Facilities, equipment and associated development N85-26692
Probabilistic computer model of optimal runway turnoffs
[NASA-CR-172549] N85-26760
AIR WATER INTERACTIONS
China's integrated circuit production N85-27302
Tropical Oceans-Global Atmosphere (TOGA) experiment planning for the Brazilian participation in TOGA global climate program
[INPE-3499-PRE/735] N85-27477
Simulation of a synchronously coupled atmosphere-ocean prediction model
[AD-A152020] N85-27482
NASA Oceanic Processes Program annual review
[NASA-TM-87565] N85-27503
AIRBORNE RADAR APPROACH
Development and flight test of a helicopter, X-band, portable precision landing system concept
[NASA-TM-86710] N85-26721
AIRBORNE/SPACEBORNE COMPUTERS
A cost-efficient control procedure for the benefit of all airspace users N85-26651
AIRCRAFT ACCIDENT INVESTIGATION
Aircraft accident report: United Airlines Flight 663, Boeing 727-222, N7647U, Denver, Colorado, May 31, 1984
[PB85-910405] N85-26686
AIRCRAFT ACCIDENTS
Aircraft accident report: United Airlines Flight 663, Boeing 727-222, N7647U, Denver, Colorado, May 31, 1984
[PB85-910405] N85-26686
AIRCRAFT COMMUNICATION
Survey of narrow band vocoder technology
[AD-A151919] N85-27114
AIRCRAFT CONTROL
Cost Effective and Affordable Guidance and Control Systems
[AGARD-CP-360] N85-26638
A method of estimating aircraft attitude from fly by wire flight control system data N85-26653
Application of linear optimal control theory to the design of the elevator control system of the DHC-2 Beaver experimental aircraft
[VTH-LR-411] N85-26729
AIRCRAFT DESIGN
Computer software for aerodynamic design of aircraft developed within the National Aerospace Laboratory N85-26613
Numerical analyses in aerodynamic design of aero-engine fan N85-26618
Computational aerodynamics in designing aircraft N85-26622
Numerical example of three-dimensional flying object in shockless transonic flow N85-26623
Computational aerodynamics for aircraft wing design N85-26627
Comparison of computational results of a few representative three-dimensional transonic potential flow analysis programs N85-26628
Three-dimensinal wing boundary layer analysis program BLAY and its application N85-26632
ACT flight research experience N85-26741
The introduction of new cockpit technology: A human factors study
[NASA-TM-86659] N85-27528
Research and development. Technical and scientific reports 1984 N85-27724
Utilization of an automated riveting system in aircraft construction
[MBB-UT-11/84-O] N85-27736
AIRCRAFT ENGINES
Nondestructive tests of ceramic components for aircraft turbines N85-26718
AIRCRAFT EQUIPMENT
A description of the process of elaborating man-machine dialog in an aircraft equipped with cathode tubes: Roles and specifications of piloted simulation methods N85-26658
Terrain following without use of forward looking sensors N85-26659
Improving inflight negative Gz restraint for aircrewmen
[AD-A151909] N85-26688
AIRCRAFT FUELS
Realisation of relaxed static stability on a commercial transport N85-26746
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe
[NASA-CR-174840] N85-27012
AIRCRAFT GUIDANCE
Cost Effective and Affordable Guidance and Control Systems
[AGARD-CP-360] N85-26638
AIRCRAFT HAZARDS
The impact of weather on aviation safety
[GPO-35-520] N85-26685
Lightning strikes on aircraft. The TRIP 82 experiment and 3-dimensional electromagnetic interferometry
[ONERA-RF-88/7154-PY] N85-26690
AIRCRAFT INDUSTRY
Characterization of solderless miniwrapping connections
[CNES-NT-112] N85-27238
AIRCRAFT INSTRUMENTS
Combinatorial performance/cost analysis of an autonomous navigation system for aircraft N85-26640
Navigation and flight director guidance for the NASA/FAA helicopter MLS curved approach flight test program
[NASA-CR-177350] N85-26691
AIRCRAFT LANDING
The use of pressure sensing taps on the aircraft wing as sensor for flight control systems N85-26660
Study of longitudinal landing flying qualities evaluation using pilot model theory
[AD-A152194] N85-26702
AIRCRAFT MAINTENANCE
Graphic simulation of a machine-repairman model
[AD-A151761] N85-26633
AIRCRAFT MANEUVERS
Application of CFD techniques toward the validation of nonlinear aerodynamic models
[NASA-TM-86715] N85-26671
Autofocus motion compensation for synthetic aperture radar and its compatibility with strapdown inertial navigation sensors on highly maneuverable aircraft
[AD-A151940] N85-26693
Piloted simulation of one-on-one helicopter air combat at NOE flight levels
[NASA-TM-86686] N85-26720
AIRCRAFT MODELS
Wing buffeting active control testing on a transport aircraft configuration in a large sonic tunnel N85-26750
AIRCRAFT NOISE
Prediction of free-field noise levels from aircraft flyover measurements
[VTH-LR-427] N85-27647
AIRCRAFT SAFETY
Generalized escape system simulation: Its purpose, recent modifications and potential
[DE85-005571] N85-26689
AIRCRAFT SPECIFICATIONS
NASA/aircraft industry standard specification for graphite fiber toughened thermoset resin composite material
[NASA-RP-1142] N85-26923
AIRCRAFT STRUCTURES
Protective coatings for aircraft structures: A review
[VTH-LR-413] N85-26704
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 1: Program compilation
[AD-A152270] N85-26727
Investigation of the influence of some paint systems and water displacing corrosion inhibitors on anodic undermining corrosion of aluminum 2024 clad alloy — aircraft structures
[VTH-LR-443] N85-27009
The application of computer aided structural optimization to the design of aircraft components
[MBB-UT-21/84-O] N85-27728
AIRCRAFT SURVIVABILITY
An empirical self-protection chaff model
[AD-A151928] N85-27115
AIRCRAFT TIRES
A feasibility study for using low boiling point fluids to change aircraft tire deflection
[AD-A152096] N85-26701
AIRFOILS
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction
[NASA-CR-175788] N85-26665
Low Reynolds number vehicles
[AGARD-AG-288] N85-26666
Automatic flight control modes for the AFTI/F-111 mission adaptive wing aircraft N85-26756
AIRFRAMES
Initial quality of advanced joining concepts
[AD-A152241] N85-27027
AIRGLOW
Observations of airglow O2(1-Sigma) atmospheric band at 8645 A and the rotational temperature at 23 deg S
[INPE-3378-PRE/653] N85-27435
Thermospheric winds observed by OI6300A Doppler shifts at 23 deg S in the Brazilian sector
[INPE-3384-RPE/470] N85-27479
AIRPORTS
Probabilistic computer model of optimal runway turnoffs
[NASA-CR-172549] N85-26760
Study of acceptance criteria for joint densities in bituminous airport pavements
[FAA-PM-85-5] N85-26761
Radioluminescent lighting for rural Alaskan runway lighting and marking
[DE85-007022] N85-26764
Acceptability testing of radioluminescent lights for VFR-night air taxi operations
[DE85-007303] N85-26765
AIRSPEED
Formulation and implementation of nonstationary adaptive estimation algorithm with applications to air-data reconstruction
[NASA-TM-86727] N85-26699
ALASKA
Glossary of landscape and vegetation ecology for Alaska
[PB85-153831] N85-27372
ALERTNESS
Shape with and without redundant colour as coding mechanism for simulated radar displays in a time-extended simple vigilance task
[AD-A151683] N85-27533
ALGAE
Technical and economic analysis of liquid fuel production from microalgae
[DE85-002926] N85-27018
ALGEBRA
Alternatives for jet engine control
[NASA-CR-175831] N85-26713

Proposal for an extended set of FORTRAN Basic Linear Algebra subprograms
[DE85-007241] N85-27562
Schubert varieties are arithmetically Cohen-Macaulay N85-27592
Quadratic spaces over discrete Hodge algebras N85-27593

ALGORITHMS
Generation of flight paths using heuristic search
[AD-A151949] N85-26894
Formulation and implementation of nonstationary adaptive estimation algorithm with applications to air-data reconstruction
[NASA-TM-86727] N85-26899
Method for evaluating perturbation in algorithms for solving navigational problems N85-26783
The effect of inaccuracies in structural models on the control of large space structures
[AD-A151794] N85-26858
Control of motion of manipulator robots on basis of first-order kinematic algorithms N85-27047
Optimal control of electric drive with simultaneous control inputs for motor current and flux N85-27049
Approximate solution of the problem of fluid oscillations in cavities of revolution N85-27056
Automation of the process of speech signal segmentation in an analogic-numeric system
[REPT-5/1984] N85-27082
Development and application of optimum sensitivity analysis of structures
[NASA-CR-175857] N85-27257
Basic research for the geodynamics program
[NASA-CR-175751] N85-27424
Parallel time 0(log N) acceptance of deterministic CFLs
[AD-A152255] N85-27539
A general purpose scatter storage subsystem and a comparison of hashing methods
[NASA-CR-175814] N85-27542
Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms
[INPE-3359-PRE/637] N85-27545
Character recognition using correlation techniques
[AD-A152006] N85-27549
A data based algorithm for choosing the window width when estimating the integral of f2(x)
[AD-A152093] N85-27553
Numerical optimization algorithm for engineering problems using microcomputer
[AD-A152135] N85-27554
Multigrid algorithms on the hypercube multiprocessor
[AD-A152200] N85-27556
Squeezing the most out of Eigenvalue solvers on high-performance computers
[DE85-007569] N85-27565
Local uniform mesh refinement on loosely-coupled parallel processors
[AD-A152199] N85-27571
Corrective-predictive systems
[BLL-M-36063-(5828.4)] N85-27573
Algorithms for determining the relative complexity of dynamic signals
[BLL-M-36111-(5828.4)] N85-27574
A fast hidden line algorithm with contour option
[NASA-CR-175803] N85-27582
Finite elements and the method of conjugate gradients on a concurrent processor
[NASA-CR-175812] N85-27588
Born inversion with a stratified reference velocity
[AD-A149222] N85-27594
Scene analysis using recursive frequency domain correlation with energy normalization
[AD-A151777] N85-27596
Complexity of dense linear system solution on a multiprocessor ring
[AD-A151970] N85-27598
Evaluation of an algorithm for the solution of the time-dependent Euler equations
[AD-A151993] N85-27600
A heuristic solution to the spacing problem: Maximizing the minimum Euclidean distance among N points in a convex region
[AD-A152116] N85-27603
Efficient parallel pseudo-random number generation
[AD-A152235] N85-27608
Probabilistic algorithms in group theory
[AD-A152253] N85-27630
Computing the singular value decomposition of a product of two matrices
[DE85-006977] N85-27631
On the choice of coordinates for semiconductor simulation
[AD-A152214] N85-27708
Discrete foundation for physics and experience
[DE85-008172] N85-27720
An adaptive technique and its application in database design N85-27748
Access path optimization for network database retrieval N85-27749

ALIGNMENT
Surveying and optical tooling technologies combined to align a skewed beamline at the LAMPF accelerator
[DE85-005902] N85-27664

ALKALI HALIDES
Polarimetric image recorder
[AD-D011605] N85-27192

ALKALI METALS
Analysis of alkali liquid metal Rankine space power systems
[DE85-005089] N85-26917

ALKANES
Transitional metal activation and functionalization of C-H bonds
[DE85-006816] N85-26949

ALLOYS
Effects of surface chemistry on hot corrosion life
[NASA-CR-174915] N85-26711
Properties and microstructures for dual alloy combinations of three superalloys with alloy 901
[NASA-TM-86987] N85-26963
On the feasibility of Ab Initio calculations of ordering alloy phase diagrams
[DE85-007073] N85-26979

ALPHABETS
Character recognition using correlation techniques
[AD-A152006] N85-27549

ALPHANUMERIC CHARACTERS
Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms
[INPE-3359-PRE/637] N85-27545

ALTIMETERS
Application of space methods in geodesy N85-26817

ALUMINATES
Ionic conduction and water diffusion in Li (BETA)-alumina
[DE85-007548] N85-27005

ALUMINUM
Spectroscopic studies of a railgun muzzle flash
[MRL-R-952] N85-26837
Ignition of metals in high pressure oxygen N85-26874
Effect of low-velocity or ballistic impact damage on the strength of thin composite and aluminum shear panels
[NASA-TP-2441] N85-26924
Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26926
The application of BRILES rivets for mechanical jointing of Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-387] N85-27279

ALUMINUM ALLOYS
Durability of Aramid reinforced aluminum laminate (ARALL)
[VTH-LR-423] N85-26933
Microstructures and properties of rapidly solidified alloys
[NASA-CR-172377] N85-26961
Evaluation of the corrosion properties of aluminum alloy 5083 weldments
[DE85-007729] N85-26977
The effect of low sheet thicknesses on the fracture toughness of an Al alloy (7075-T6) — Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-425] N85-26984
Influence of pretreatment, environment and strain rate on stress corrosion cracking of the aluminum alloy 7075-T6
[VTH-LR-433] N85-26985
Investigation of the pitting potential of rapidly solidified aluminum-lithium alloys
[VTH-LR-434] N85-26986
Investigation of the influence of some paint systems and water displacing corrosion inhibitors on anodic undermining corrosion of aluminum 2024 clad alloy — aircraft structures
[VTH-LR-443] N85-27009
Special features of the one-sided automatic welding of structures of Al-Mg alloys N85-27222

ALUMINUM ARSENIDES
A study of Ga(.47)In(.53)As and Al(.48)In(.52)As for very high frequency device applications
[AD-A151995] N85-27706

ALUMINUM OXIDES
Particulate and whisker toughened alumina composites
[DE85-005239] N85-26930
Thermal annealing of Fe implanted Al2O3 in oxidizing and reducing environment: Revised version
[DE85-007546] N85-26983
Test and modeling for sintering theory
[DE85-007761] N85-27004

AMAZON REGION (SOUTH AMERICA)
System of interpretation of remote sensing data when hydrocarbons are present, volume 2
[INPE-3087-TDL/162-VOL-2] N85-27326
The ARGOS system in Brazil — hydrology N85-27349

AMORPHOUS MATERIALS
Structural inhomogeneities in amorphous nickel-phosphorus alloy
[BLL-M-36103-(5828.4)] N85-26960
Solid state hydrogen pumping and storage material
[AD-D011610] N85-27011
Electrical resistivity in amorphous metals: Consequences of phonon ineffectiveness in the diffraction model
[AD-A152130] N85-27150

AMPLIFICATION
Earth station antenna sidelobe characteristics
[PB85-164986] N85-27159

AMPLITUDES
Fatigue damage and small crack growth during biaxial loading N85-27247
Studies of collisional and nonlinear radiative process for development of coherent UV and XUV sources
[AD-A152001] N85-27670

ANAEROBES
Comparative anaerobic power of males and females
[AD-A151960] N85-27523

ANALOG TO DIGITAL CONVERTERS
A portable pulse analyzer for nuclear geophysics using a Sinclair-TK microcomputer
[INPE-3278-PRE/601] N85-27686

ANALYSIS (MATHEMATICS)
The nonlinear analysis of thick composite plates using a cubic spline function
[AD-A152115] N85-27268
Symbiosis between postgraduate training and research projects: A successful experience
[INPE-3216-PRE/569] N85-27330
Impact of ozone on vegetation
[PB85-159937] N85-27403
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology
[AD-A151956] N85-27548

ANALYTIC FUNCTIONS
Conditions for the possibility of conformal sewing
[ST-AASF-IMD-58] N85-27625

ANEMIAS
Research opportunities in loss of red blood cell mass in space flight
[NASA-CR-175808] N85-27517

ANGLE OF ATTACK
Measurements of the symmetric aerodynamic coefficients for flat faced cylinders in the angle of attack regime 0 to 90 deg for transonic and supersonic speeds
[FFA-TN-1984-04] N85-26675

ANGLES (GEOMETRY)
Free-surface phenomena under low- and zero-gravity conditions
[NASA-CR-175835] N85-27168

ANGULAR MOMENTUM
Microscopic analysis of angular momentum projected HFB-states in terms of interacting bosons
[DE85-007629] N85-27661
Mutli-particle quantum mechanics obeying fractional statistics
[DE85-007830] N85-27723

ANGULAR VELOCITY
Optimum rotation of solid body with 1 axis of symmetry N85-26781

ANIMALS
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405
MARMAP survey of the continental shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia (1977 - 1983). Atlas 1: Summary of operations
[PB85-150965] N85-27506

ANISOTROPIC MEDIA
Multiple scattering of electromagnetic waves in discrete random media
[AD-A151766] N85-27112

ANISOTROPIC SHELLS
Stability of anisotropic cylindrical sandwich shells N85-27065

ANISOTROPY
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967

Polarimetric image recorder
[AD-D011605] N85-27192
Active and passive remote sensing of ice
[AD-A151741] N85-27369
The soft X-ray background as a supernova blast wave viewed from inside: Solar abundance models
[NASA-CR-175767] N85-27813

ANNEALING
Relationships between microstructure and microfissuring in alloy 718 N85-26876
Solution softening in molybdenum-rhenium alloys
[DE85-006706] N85-26972
Thermal annealing of Fe implanted Al2O3 in oxidizing and reducing environment: Revised version
[DE85-007546] N85-26983

ANNUAL VARIATIONS
Year-to-year variability of components of Earth's radiation budget according to satellite measurement data N85-26821
The seasonal cycle of atmospheric CO in the Southern Hemisphere N85-27447
Fog advection in the Namib N85-27454
Air flow of the western coastal boundary of South Africa and its influence on the ocean N85-27459
Forecast of Atlantic seasonal hurricane activity for 1985 N85-27470
AWS (Air Weather Service) climatic briefs: North America
[AD-A152161] N85-27483
Solar-Geophysical Data Number 484, December 1984. Part 1 (prompt reports): Data for November 1984, October 1984 and late data
[NASA-CR-175829] N85-27819

ANOMALIES
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967

ANTARCTIC REGIONS
USSR report: Earth sciences
[JPRS-UES-85-005] N85-27307
Atmospheric radon measurements in the Antarctic Penninsula: A preliminary report
[INPE-3398-PRE/667] N85-27436

ANTENNA ARRAYS
A study of computational techniques for noncanonical microstrip antennas and arrays
[AD-A152216] N85-27123

ANTENNA RADIATION PATTERNS
Radiation and scattering of spiral antennas
[AD-A151929] N85-27116
Earth station antenna sidelobe characteristics
[PB85-164986] N85-27159

ANTENNAS
Calibration methods in millimeter-wave radioastronomy
[INPE-3481-PRE/724] N85-27778

ANTHROPOMETRY
Comparative anaerobic power of males and females
[AD-A151960] N85-27523

ANTIFRICTION BEARINGS
Powder metallurgy bearings for advanced rocket engines N85-26881

ANTISHIP WARFARE
Optmizing the specifications for an air-surface laser system N85-26644

ANTISUBMARINE WARFARE
The NAVTAG (Naval Tactical Game) system and its modification to include the SH-60B helicopter
[AD-A152004] N85-27624

ANTISUBMARINE WARFARE AIRCRAFT
The NAVTAG (Naval Tactical Game) system and its modification to include the SH-60B helicopter
[AD-A152004] N85-27624

APPLICATIONS OF MATHEMATICS
Compilation of abstracts of theses submitted by candidates for degrees
[AD-A151722] N85-27739

APPLICATIONS PROGRAMS (COMPUTERS)
Mapping principles for the standards interface for computer aided design
[PB85-177905] N85-27566

APPROACH
An IKBS approach to image understanding
[AD-A151992] N85-27599

APPROACH CONTROL
Aspects of application of ACT systems for pilot workload alleviation N85-26734

APPROPRIATIONS
National Telecommunications and Information Administration authorization
[GPO-38-660] N85-27766

APPROXIMATION
An approximation theory for nonlinear evolution equations and single conservation laws N85-26614
A numerical procedure on three-dimensional parabolic flow in duct N85-26620
Application of conformal mapping to grid generation N85-26621
Approximate solution of the problem of fluid oscillations in cavities of revolution N85-27056
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172
An approximation to the problem of a pin-loaded hole in an orthothropic plate
[VTH-LR-386] N85-27278
Solving the minimal least squares problem subject to bounds on the variables
[TRITA-NA-8215] N85-27580
Uniformly high-order accurate non-oscillatory schemes, 1
[NASA-CR-175766] N85-27589
Eigenvalue approximation methods for quantum lattice Hamiltonians N85-27627

AQUATIC PLANTS
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405

AQUIFERS
Report on regional groundwater flow modeling for the Palo Duro Basin, Texas
[DE85-007490] N85-27370
Central solar heating plants with seasonal storage. Evaluation of systems concepts based on heat storage in aquifers
[DE85-006788] N85-27396
Groundwater model for an island aquifer: Bribie Island groundwater study
[CE-44] N85-27398

ARC WELDING
Underwater pipeline: Welding by high frequency induction
[BLL-WI-TRANS-682-(9312.57)] N85-27221
Welder training/welder testing
[BLL-WI-TRANS-683-(9312.57)] N85-27223

ARCHITECTURE
Design of computer-related workstations in relation to job functions and productivity
[AD-A151938] N85-27534

ARCHITECTURE (COMPUTERS)
Recent advances in supercomputers N85-26625
Navigation: Accounting for copy N85-26641
A modular dissimilar redundant computer designed for high integrity control N85-26751
Design and specification of a local area network architecture for use in real-time flight simulation
[AD-A152242] N85-26762
Reliability models for dataflow computer systems
[NASA-CR-175813] N85-27543
Evaluation of Ada (trademark) as a communications programming language, volume 1
[AD-A152314] N85-27559
Evaluation of Ada (trademark) as a communications programming language. Volume 3: Trusted software application
[AD-A152316] N85-27561
Continued development and implementation of the Universal Network Interface Device (UNID) 2, Digital Engineering Laboratory Network (DELNET), volume 1
[AD-A151935] N85-27569
Continued development and implementation of the Universal Network Interface Device (UNID) 2 in the Digital Engineering Laboratory Network (DELNET), volume 2
[AD-A151947] N85-27570
Complexity of dense linear system solution on a multiprocessor ring
[AD-A151970] N85-27598
Multiple array processors for ocean acoustic problems
[AD-A152174] N85-27641
Computational plasma physics and supercomputers, revision 1
[DE85-007228] N85-27687

ARCTIC REGIONS
USSR report: Earth sciences
[JPRS-UES-85-005] N85-27307
Operational experiences with the ARGOS system in Greenland N85-27353

ARGON LASERS
Fiber optic Raman thermometer for Space Shuttle main engine preburner profiling N85-26904
A study of mode-locked argon ion-dye laser systems N85-27205

ARIZONA
Preliminary assessment of climatic change during late Wisconsin time, southwest Great Basin and vicinity, Arizona, California and Nevada
[DE85-006343] N85-27488

ARMATURES
Metal armatures for railguns
[AD-A152129] N85-26838

ARMED FORCES (FOREIGN)
Investigation of the requirement for auxiliary heating of Canadian forces personnel
[AD-A151950] N85-27522

ARMED FORCES (UNITED STATES)
Manufacturing methods and technology CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) related efforts (FY 1980 - 1986)
[AD-A151817] N85-27547
Continued development and implementation of the Universal Network Interface Device (UNID) 2 in the Digital Engineering Laboratory Network (DELNET), volume 2
[AD-A151947] N85-27570
Computer assisted flight schedule optimization
[AD-A151689] N85-27623
Summary of Research, Academic Departments, 1983 - 1984
[AD-A151724] N85-27741

ARRAYS
Maintenance of photovoltaic power systems
[AD-A152299] N85-27390

ARTIFICIAL INTELLIGENCE
Generation of flight paths using heuristic search
[AD-A151949] N85-26694
Symbiosis between postgraduate training and research projects: A successful experience
[INPE-3216-PRE/569] N85-27330
Diagnosis: Using automatic test equipment and an artificial intelligence expert system
[AD-A151918] N85-27576
Artificial intelligence in space platforms
[AD-A152078] N85-27578
Research in knowledge representation for natural language understanding
[AD-A152260] N85-27579

ARTIFICIAL SATELLITES
Positions of relative equilibrium of satellite-gyrostat N85-26777
Observability in problem of correction of inertial navigation systems using additional information from artificial Earth satellite N85-26785
Satellite selection criteria N85-27288
Atmospheric density model N85-27297
Simultaneous Earth observations from 2 satellites
[NASA-TM-86204] N85-27325

ASIA
AWS (Air Weather Service) climatic briefs: Asia
[AD-A151944] N85-27481

ASPECT RATIO
Hypersonic nonequilibrium gas flow past zero-aspect wing N85-27063
Multiple scattering of electromagnetic waves in discrete random media
[AD-A151766] N85-27112

ASSEMBLIES
A Gimbal sizing analysis for an IPACS rotating assembly
[NASA-CR-172524] N85-26913

ASTEROIDS
An analysis of alternate hydrogen sources for lunar manufacture
[DE85-007234] N85-27792

ASTRODYNAMICS
Accuracy in predicting orbital motion of artificial Earth satellite N85-26783
Optimal relative data weights N85-27296

ASTRONOMICAL TELESCOPES
Dall-Null tester for spaceborne applications
[AD-A151772] N85-27779

ASTRONOMY
Astrometric method advances Astronomy, geodesy N85-27306

ASTROPHYSICS
Satellite research on solar flares N85-26776
The soft X-ray background as a supernova blast wave viewed from inside: Solar abundance models
[NASA-CR-175767] N85-27813

ASYMMETRY
Predicting fully plastic mode 2 crack growth from an asymmetric defect
[AD-A152227] N85-27269

ASYMPTOTIC METHODS
Asymptotic solutions of MHD equations with finite conductivity
[REPT-12/1984] N85-27581
Comments on the paper by F. Pegoraro, L. Suglyama: Spatial diffusion of charged high-energy fusion products by shear Alfven perturbations
[INPE-3291-PRE/606] N85-27675

ATLANTIC OCEAN
ARGOS-tracked drifters in the Rockall Trough N85-27340

Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic N85-27355
X-ray intensification at balloon altitudes of the South Atlantic magnetic anomaly in association with geomagnetic activity
[INPE-3469-PRE/712] N85-27437
The sea level response to weather along the coast of southern Africa N85-27446
On the 1983 drought in northeast Brazil
[INPE-3412-PRE/678] N85-27476
Tropical Oceans-Global Atmosphere (TOGA) experiment planning for the Brazilian participation in TOGA global climate program
[INPE-3499-PRE/735] N85-27477
An evaluation of discretized conditional probability and linear regression threshold techniques in model output statistics forecasting of visibility over the north Atlantic Ocean
[AD-A151955] N85-27619

ATMOSPHERIC & OCEANOGRAPHIC INFORM SYS
A wind-bivane/microprocessor system for on-line prediction and display of pollutant distributions N85-27449

ATMOSPHERIC ATTENUATION
Meteorological factors in Earth-Satellite propagation
[NASA-CR-175764] N85-27089
Synchronizing heavily encoded data in bad weather N85-27099
EHF attenuation derived from emission temperatures in light rain
[AD-A151166] N85-27110

ATMOSPHERIC BOUNDARY LAYER
Study of the functions of similarity of the planetary boundary layer. Part 2: Results
[INPE-3130-PRE/521-VOL-2] N85-27429

ATMOSPHERIC CHEMISTRY
Emission inventory applications to regional acid deposition modeling
[PB85-157386] N85-27033
Measurement of elements in the stratosphere
[NASA-CR-175891] N85-27414
Free radicals in the stratosphere: A new observational technique N85-27415
Atmospheric chemistry
[INPE-3190-PRE/554] N85-27430

ATMOSPHERIC CIRCULATION
A study of the effect of gently varying terrain on atmospheric flow near the surface N85-27411
Wave dynamics and transport in the stratosphere
[NASA-CR-175789] N85-27413
Study of the functions of similarity of the planetary boundary layer. Part 1: Theory
[INPE-3129-PRE/520-PT-1] N85-27428
Study of the functions of similarity of the planetary boundary layer. Part 2: Results
[INPE-3130-PRE/521-VOL-2] N85-27429
Radon concentration inversion in the troposphere: Still unexplained
[INPE-3360-PRE/638] N85-27431
Upper-air data collection during CAPTEX
[DE85-006300] N85-27438
Evolution of stratospheric aerosol size distribution from ground-based radiometric measurements: A study of El Chichon aerosol
[DE85-007555] N85-27439
Theory and modeling of the interaction between subgrid scale orography and large scale flow
[DM-43] N85-27440
Geophysical monitoring for climatic change, number 12
[PB85-172278] N85-27496
Circulation statistics from January and July: Simulation with the NCAR (National Center for Atmospheric Research) community climate model (CCMOB)
[PB85-165637] N85-27497
Great Lakes winter weather and ice conditions for 1982-83
[PB85-165009] N85-27498
NASA Oceanic Processes Program annual review
[NASA-TM-87565] N85-27503

ATMOSPHERIC COMPOSITION
One approach to remote sensing of total ozone content N85-26822
Comparison of observed and predicted short-term tracer-gas concentrations in the atmosphere
[DE85-007566] N85-27399
Interactive effects of acid rain and gaseous air pollutants on natural terrestrial vegetation
[DE85-005255] N85-27401
Acid precipitation in North America: 1980, 1981 and 1982 annual data summaries from acid deposition system data base
[PB85-162477] N85-27410
Measurement of elements in the stratosphere
[NASA-CR-175891] N85-27414
Stratospheric ClO: In-situ detection with a new approach N85-27416
The copper vapor laser N85-27417
In-situ stratospheric ozone measurements: Recent results and their implications N85-27419
Water vapor N85-27420
Role and fate of ozone in the atmosphere N85-27421
Atmospheric radon measurements in the Antarctic Penninsula: A preliminary report
[INPE-3398-PRE/667] N85-27436
Elemental analysis of aerosols in Transvaal urban and power-producing areas using time and size-resolved samples N85-27443
Geophysical monitoring for climatic change, number 12
[PB85-172278] N85-27496
Cometary atmospheres: Modeling the spatial distribution of observed neutral radicals
[NASA-CR-175852] N85-27781

ATMOSPHERIC IONIZATION
Dependence of equatorial F-region plasma bubble rise velocity and dynamo electric field on solar cycle
[INPE-3439-PRE/696] N85-27434
X-ray intensification at balloon altitudes of the South Atlantic magnetic anomaly in association with geomagnetic activity
[INPE-3469-PRE/712] N85-27437

ATMOSPHERIC MODELS
Wind modelling for increased aircraft operational efficiency N85-26652
Modeling plasma mantle of Earth's magnetosphere N85-26790
Emission inventory applications to regional acid deposition modeling
[PB85-157386] N85-27033
Theory and modeling of the interaction between subgrid scale orography and large scale flow
[DM-43] N85-27440
Use of a network of telemetered meteorological stations for prediction of the distribution of an atmospheric tracer N85-27458
The problem of atmospheric turbulence
[NASA-CR-175783] N85-27464
Tropical Oceans-Global Atmosphere (TOGA) experiment planning for the Brazilian participation in TOGA global climate program
[INPE-3499-PRE/735] N85-27477
Simulation of a synchronously coupled atmosphere-ocean prediction model
[AD-A152020] N85-27482
Circulation statistics from January and July: Simulation with the NCAR (National Center for Atmospheric Research) community climate model (CCMOB)
[PB85-165637] N85-27497
Test of lidar inversion algorithm sensitivity to atmospheric backscatter and extinction parameters, revision A
[AD-A152082] N85-27671
Monodeurated methane in the outer solar system. 2. Its detection on Uranus at 1.6 microns
[NASA-CR-175762] N85-27782

ATMOSPHERIC MOISTURE
Ice multiplication in summertime cumulus clouds in the BEWMEX area N85-27445
Precipitable water in the atmosphere, determined from surface dewpoint values N85-27457
Atmospheric frontal zone studies
[NASA-CR-175293] N85-27469

ATMOSPHERIC OPTICS
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-3, 220/May-June
[ESA-TT-882] N85-26636

ATMOSPHERIC PHYSICS
Academician Zuyev notes plans for lasers on spacecraft for atmospheric research N85-26775

ATMOSPHERIC PRESSURE
The sea level response to weather along the coast of southern Africa N85-27446
Summary of Meteorological Observations, Surface (SMOS), Dallas, Texas
[AD-A150599] N85-27480

ATMOSPHERIC RADIATION
Glow of ionospheric F-layer in Line 630 nm determined from photographs taken aboard Salyut-6 orbital station: Interpretation of results N85-26799
One approach to remote sensing of total ozone content N85-26822

ATMOSPHERIC SCATTERING
Test of lidar inversion algorithm sensitivity to atmospheric backscatter and extinction parameters, revision A
[AD-A152082] N85-27671

ATMOSPHERIC SOUNDING
Assessment of VAS soundings in the analysis of a preconvective environment
[NASA-TM-86205] N85-27427

ATMOSPHERIC TEMPERATURE
Greenhouse effect in Earth's primordial atmosphere N85-27310
Regularities in recent changes in surface air temperature and atmospheric precipitaion fields N85-27311

ATMOSPHERIC TURBULENCE
Response of a wind turbine blade to seismic and turbulent wind excitations N85-27375
Air flow of the western coastal boundary of South Africa and its influence on the ocean N85-27459
Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California
[NASA-CR-3901] N85-27463
The problem of atmospheric turbulence
[NASA-CR-175783] N85-27464

ATOMIC BEAMS
Hydrogen vibrational population distributions and negative ion generation in tandem high-density hydrogen discharges
[DE85-006764] N85-27657
High efficiency ionizer using a hollow cathode discharge plasma
[DE85-006690] N85-27693

ATOMIC COLLISIONS
Ionization coefficient for atomic collisions in meteor trail N85-26792

ATOMIC ENERGY LEVELS
Optogalvanic measurement of even parity Rydberg levels in krypton gas
[AD-A152113] N85-26943

ATOMIC SPECTRA
Optogalvanic measurement of even parity Rydberg levels in krypton gas
[AD-A152113] N85-26943

ATOMIC STRUCTURE
Tilt grain boundaries in NiO
[DE85-006839] N85-26978

ATOMS
Periodic cluster simulation of a disordered impurity system
[INPE-3453-PRE/705] N85-27626
Studies of collisional and nonlinear radiative process for development of coherent UV and XUV sources
[AD-A152001] N85-27670
Atom location by electron channeling analysis
[DE85-007549] N85-27716

ATTACK AIRCRAFT
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 2: Final report on program enhancement and delivery
[AD-A152269] N85-26726

ATTENUATION
Multiple scattering of electromagnetic waves in discrete random media
[AD-A151766] N85-27112
LIGHT: A ray tracing code to simulate light collection in scintillation spectrometers and light pipes
[DE85-007213] N85-27673

ATTITUDE (INCLINATION)
A method of estimating aircraft attitude from fly by wire flight control system data N85-26653

ATTITUDE GYROS
Optimum parameters of aerogyroscopic satellite orientation system N85-26782

AUDITORY SIGNALS
An overview of stochastic signal modeling
[AD-A152144] N85-27605

AUGMENTATION
A modern control design methodology with application to the CH-47 helicopter
[AD-A151946] N85-26723

AURORAS
Study of spatial distribution of auroras N85-27315

AUSTENITIC STAINLESS STEELS
Swelling behavior of titanium-modified AISI 316 alloys
[DE85-007470] N85-26962
Method of investigating accumulations of damage to weld joints in the case of low-cycle creep
[BLL-CE-TRANS-8088-(9022.09)] N85-27219

AUTOIONIZATION
Trends in the electric field enhancement of dielectronic recombination cross sections
[DE85-006920] N85-27711

AUTOMATA THEORY
New stage in robotics development N85-27045

AUTOMATIC CONTROL
Experience of sheet stamping robotic complexes N85-27041
Automatic manipulators for forging rollers N85-27042
Updating model RPD-1.25 industrial robot N85-27043

Industrial robots and automatic manipulators for forging and pressing operations at Second International Exhibition N85-27044
Status, prospects of computer-aided design discussed N85-27073
A robotic system for preparing reagent and dilution vials
[DE85-008262] N85-27231
A Dictionary-Directory System (DDS) for the SPLICE system
[AD-A152223] N85-27759

AUTOMATIC WEATHER STATIONS
DB2 and DB3: The next generation — buoys N85-27337
An operational buoy network collecting meteorological data N85-27351
Operational experiences with the ARGOS system in Greenland N85-27353
Data from BOC-yachts: A significant input to Southern Hemisphere analysis N85-27356

AUTOMATION
System design of automated VLSI (Very Large Scale Integrated) test station and implementation of selected system aspects
[AD-A151961] N85-27147
The introduction of new cockpit technology: A human factors study
[NASA-TM-86659] N85-27528

AUTOMOBILE ENGINES
Ceramic technology for advanced heat engines project
[DE85-004798] N85-27002

AUTOMOBILE FUELS
Low pressure storage of methane on interlayered clays for potential vehicular applications
[DE85-006949] N85-27017

AUTOMOBILES
Nematic liquid crystals for car dashboards
[BMFT-FB-T-84-298] N85-27718
Hybrid propulsion technologies for urban bus transit
[PB85-157469] N85-27773

AVALANCHE DIODES
Photon detection with cooled avalanche photodiodes: Theory and preliminary experimental results N85-27096

AVERAGE
Local likelihood estimation
[DE85-007238] N85-27620

AVIONICS
Design adequacy: An effectiveness factor N85-26642
Design-To-Cost (DTC) methodology to achieve affordable avionics N85-26645
Navigation and flight director guidance for the NASA/FAA helicopter MLS curved approach flight test program
[NASA-CR-177350] N85-26691
Avionics integrity issues presented during NAECON (National Aerospace and Electronics Convention) 1984
[AD-A151923] N85-26707

AXES (REFERENCE LINES)
Acceleration resistant combination of opposite-handed piezoelectric crystals
[AD-D011626] N85-27143

AXIAL COMPRESSION LOADS
An analysis for axially compressed orthotropic shells with a multimode imperfection representation
[VTH-LR-422] N85-27281

AXIAL STRAIN
Finite axisymmetric deformation of a thin shell of revolution N85-27251
Transverse periodic boundary conditions in molecular dynamics with uniaxial strain shock waves
[DE85-006497] N85-27656

AXIAL STRESS
Mechanical properties of high performance carbon fibers N85-26922

AXISYMMETRIC FLOW
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
Studies of structure and modeling in turbulent shear flows
[AD-A151807] N85-27170
Computation model of turbulent free flow: Application to axisymmetric jets
[ISL-R-126/83] N85-27185

B

B STARS
Studies of hot B subdwarfs. Part 2: Energy distributions of three bright sdB/sdOB stars in the 950-5500 angstrom range
[NASA-CR-175854] N85-27775

BACKSCATTERING
Modeling the backscattering and transmission properties of vegetation canopies
[E85-10099] N85-27320
Test of lidar inversion algorithm sensitivity to atmospheric backscatter and extinction parameters, revision A
[AD-A152082] N85-27671

BACKWARD FACING STEPS
An experimental study of compressible turbulent reattaching free shear layers N85-27161

BACTERIOLOGY
Structural-functional changes in bacterial cells under spaceflight conditions N85-26812

BALANCING
Development and application of a unified balancing approach with multiple constraints N85-26891

BALL BEARINGS
Development of new materials for turbopump bearings N85-26877
Bearings working group N85-26878
Hybrid bearings for LH2 and LO2 turbopumps N85-26880
Rolling contact fatigue life of chromium ion plated 440C bearing steel N85-26882

BALLISTIC TRAJECTORIES
AN investigation into the control limitations of a bank to turn missile in the terminal homing phase
[AD-A152193] N85-26896

BALLISTICS
Effect of low-velocity or ballistic impact damage on the strength of thin composite and aluminum shear panels
[NASA-TP-2441] N85-26924

BALLOON SOUNDING
Upper-air data collection during CAPTEX
[DE85-006300] N85-27438

BALLOON-BORNE INSTRUMENTS
Free radicals in the stratosphere: A new observational technique N85-27415
Stratospheric ClO: In-situ detection with a new approach N85-27416

BALLOONING MODES
Comments on the paper by F. Pegoraro, L. Sugiyama: Spatial diffusion of charged high-energy fusion products by shear Alfven perturbations
[INPE-3291-PRE/606] N85-27675
Ballooning beta limits of dee and bean shaped Tokamaks
[IPPJ-713] N85-27676

BANDPASS FILTERS
A short range, high accuracy radar ranging system
[AD-A152195] N85-27122
Topics in time delay estimation
[AD-A152231] N85-27607

BARIUM
Experimental research on ionospheric disturbance caused by cumulative barium vapor injection N85-26787

BAROCLINITY
Atmospherically forced, coastally trapped, long period gravity waves off the south coast of southern Africa N85-27461

BARS
Pyrotechnic shock simulation using the controlled response of a resonating bar fixture
[DE85-006537] N85-27181

BARYONS
A 1-2 GeV/c beam line for hypernuclear and kaon research
[DE85-007623] N85-27659

BATTERY CHARGERS
INEL electric vehicle laboratory qualification: Transition test results and comparisons with JPL ETV1-2 data
[DE85-008006] N85-27772

BAYES THEOREM
Estimation of launch vehicle performance parameters
[AD-A151927] N85-26839

BEAM CURRENTS
Generalization of the Child-Langmuir relation for 1-dimensional time-dependent diodes
[DE85-007386] N85-27152

BEAMS (RADIATION)
The 10 MWe solar thermal central receiver pilot plant: Beam safety tests and analyses
[SAND-83-8035] N85-27379
A 1-2 GeV/c beam line for hypernuclear and kaon research
[DE85-007623] N85-27659

BEAMS (SUPPORTS)
Adaptation of continuous beams and the method of optimizing the flexibility of their elastic supports. Theorem on maximal adaptation loading, supplement
[REPT-10/1984-SUPPL] N85-27241
Principles of wave formation along web of H-beams
[BLL-M-36041-(5826.4)] N85-27253
Nonlinear equations for dynamics of pretwisted beams undergoing small strains and large rotations
[NASA-TP-2470] N85-27258

BEARING (DIRECTION)
Wave directional spectra via ARGOS N85-27343
UTM (Universal Transverse Mercator) determinations from geographical data
[AD-A152293] N85-27610

BEARING ALLOYS
Powder metallurgy bearings for advanced rocket engines N85-26881

BEARINGLESS ROTORS
Electric motors with elastically mounted rotors N85-27048

BEARINGS
Advanced rocket engine cryogenic turbopump bearing thermal model N85-26879
Effects of bearing deadbands on bearing loads and rotor stability N85-26889
Reusable rocket engine turbopump condition monitoring N85-26907
Non-contact hydrostatic bearings N85-27046
Fatigue life analysis of a turboprop reduction gearbox
[NASA-TM-87014] N85-27228

BERMUDA
AWS (Air Weather Service) climatic briefs: North America
[AD-A152161] N85-27483

BERYL
Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208

BETA FACTOR
Ballooning beta limits of dee and bean shaped Tokamaks
[IPPJ-713] N85-27676

BIAS
Switching mixer
[AD-D011602] N85-27139

BIBLIOGRAPHIES
The biological effects of radiofrequency radiation N85-27131
A bibliography of reports of the Sandia solar thermal distributed receiver systems project
[SAND-84-0313] N85-27378
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405
Aerospace medicine and biology: A continuing bibliography with indexes, supplement 271, May 1985
[NASA-SP-7011(271)] N85-27514
Compilation of abstracts of theses submitted by candidates for degrees
[AD-A151722] N85-27739

BIHARMONIC EQUATIONS
Multinomial form of the solution of problems of the statistics of elastic rectangular disks
[REPT-17/1984] N85-27244

BINARY ALLOYS
Models of long-period superstructure
[DE85-007659] N85-26981

BINARY MIXTURES
Ca-Ga, Sr-Ga and Ba-Ga binary systems
[DE85-006454] N85-26980

BIOASTRONAUTICS
Research opportunities in loss of red blood cell mass in space flight
[NASA-CR-175808] N85-27517

BIOCHEMISTRY
Experiments in microwave exposure in the rat: Body temperature, serum chemistry and the use of chemical restraint
[PB85-156834] N85-27512

BIOCONVERSION
Current alternative energy research and development in Illinois
[PB85-163137] N85-27397

BIOENGINEERING
A communications link for an implantable electrode array
[AD-A152238] N85-27510
Bioengineering and rehabilitation: Windows of opportunity past, present and future
[NASA-EP-216] N85-27516

BIOINSTRUMENTATION
A communications link for an implantable electrode array
[AD-A152238] N85-27510

BIOLOGICAL EFFECTS
The Impact of Proposed Radio Frequency Radiation Standards on Military Operations
[AGARD-LS-136] N85-27128

The physical interactions of radiofrequency radiation fields and biological systems N85-27129
The biological effects of radiofrequency radiation N85-27131
The cumulative effects of long term exposure to low levels of radiofrequency radiation (RFR) N85-27132
The medical results of human exposures to radio frequency radiation N85-27133
Review of epidemiological studies of human exposures to radiofrequency radiation N85-27134
Evaluation of human exposures to low frequency fields N85-27135
Development and application of new radiofrequency radiation safety standards N85-27137
Interactive effects of acid rain and gaseous air pollutants on natural terrestrial vegetation [DE85-005255] N85-27401
Aerospace medicine and biology: A continuing bibliography with indexes, supplement 271, May 1985 [NASA-SP-7011(271)] N85-27514
Biological influences of low-frequency sinusoidal electromagnetic signals alone and superimposed on RF carrier waves [PB85-161248] N85-27527

BIOPHYSICS
Evaluation of human exposures to low frequency fields N85-27135

BIT ERROR RATE
Bit error rate of coherent M-ary PSK N85-27098

BITUMENS
Study of acceptance criteria for joint densities in bituminous airport pavements [FAA-PM-85-5] N85-26761

BLACK BODY RADIATION
Theoretical studies of solar-pumped lasers [NASA-CR-175801] N85-27206

BLACK HOLES (ASTRONOMY)
A numerical study of nonspherical black hole accretion N85-27780

BLADES (CUTTERS)
Device for preventing intrusion of a blade during vibration cutting of intermittent cutting with a lathe N85-27232

BLANKETS (FUSION REACTORS)
Fusion-power-core design of a Compact Reversed-Field Pinch Reactor (CRFPR) [DE85-007710] N85-27692

BLOOD PLASMA
Research opportunities in loss of red blood cell mass in space flight [NASA-CR-175808] N85-27517

BLUNT BODIES
Navier-Stokes solution of hypersonic blunt-nosed body flowfields N85-26624

BLURRING
New image deblurring method described N85-27305

BOATS
Data from BOC-yachts: A significant input to Southern Hemisphere analysis N85-27356

BODY TEMPERATURE
Thermal consequences of localized SAR from RFR exposures N85-27130
Experiments in microwave exposure in the rat: Body temperature, serum chemistry and the use of chemical restraint [PB85-156834] N85-27512
Investigation of the requirement for auxiliary heating of Canadian forces personnel [AD-A151950] N85-27522

BODY-WING CONFIGURATIONS
Comparison of computational results of a few representative three-dimensional transonic potential flow analysis programs N85-26628
The role of computational fluid dynamics in aeronautical engineering N85-26629

BOILERS
The use of heat pumps in district heat supply [BLL-OA-TRANS-2728-(6196.3)] N85-27163

BOMBER AIRCRAFT
The effect of load factor on aircraft handling qualities [AD-A152118] N85-26724
The introduction of new cockpit technology: A human factors study [NASA-TM-86659] N85-27528

BOMBS (ORDNANCE)
Optmizing the specifications for an air-surface laser system N85-26644

BONES
Histological and compositional responses of bone to immobilization and other experimental conditions [NASA-CR-175837] N85-27518

BOREL SETS
Schubert varieties are arithmetically Cohen-Macaulay N85-27592

BORESIGHT ERROR
Ziv-Zakai bound applied to an amplitude-comparison monopulse radar [AD-A151937] N85-27118

BORN APPROXIMATION
Born inversion with a stratified reference velocity [AD-A149222] N85-27594

BORON
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5) [AD-A152281] N85-26967

BOSONS
Overview of the physics issues at the SSC [DE85-007074] N85-27634
Boson degrees of freedom in Fermion many-body systems [DE85-006997] N85-27660

BOUNDARIES
An IKBS approach to image understanding [AD-A151992] N85-27599
Transverse periodic boundary conditions in molecular dynamics with uniaxial strain shock waves [DE85-006497] N85-27656

BOUNDARY LAYER CONTROL
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction [NASA-CR-175788] N85-26665

BOUNDARY LAYER EQUATIONS
Computational aerodynamics in designing aircraft N85-26622
Boundary layer at moving cylinder surface N85-27064

BOUNDARY LAYER FLOW
Comparison of computational results of a few representative three-dimensional transonic potential flow analysis programs N85-26628
A curved test section for research on transonic shock wave-boundary layer interaction [VTH-LR-414] N85-26682
Numerical solution of transonic normal shock wave-boundary layer interaction using the Bohning-Zierop model --- wind tunnel flow [VTH-LR-416] N85-26683
Numerical analysis of flow non-uniformity in the hot gas manifold of the Space Shuttle main engine N85-26899
Vortex studies relating to boundary layer turbulence and noise [NASA-TM-87475] N85-27169

BOUNDARY LAYER SEPARATION
Low-speed aerodynamic test of an axisymmetric supersonic inlet with variable cowl slot [NASA-TM-87039] N85-26710
Structural stability and bifurcation in conical flow fields [VTH-LR-424] N85-27282

BOUNDARY LAYER STABILITY
Structural stability and bifurcation in conical flow fields [VTH-LR-424] N85-27282

BOUNDARY LAYERS
Low Reynolds number vehicles [AGARD-AG-288] N85-26666
Modeling plasma mantle of Earth's magnetosphere N85-26790

BOUNDARY VALUE PROBLEMS
A numerical design method for three-dimensional transonic wings N85-26631
Three-dimensinal wing boundary layer analysis program BLAY and its application N85-26632
Optimum rotation of solid body with 1 axis of symmetry N85-26781
Accuracy of the calculated stress field around a craze [DE85-005520] N85-27272
An approximation to the problem of a pin-loaded hole in an orthothropic plate [VTH-LR-386] N85-27278
Incorporation of an elliptical boundary condition into the program POISSON [DE85-006820] N85-27564
The vector potential in a branched Riemann space [VTH-LR-395] N85-27614

BRAIN
Does a 50-cycle alternating field have central nervous effects? [BLL-CE-TRANS-8083-(9022.09)] N85-27507
Biological influences of low-frequency sinusoidal electromagnetic signals alone and superimposed on RF carrier waves [PB85-161248] N85-27527

BRANCHING (MATHEMATICS)
The vector potential in a branched Riemann space [VTH-LR-395] N85-27614

BRAZIL
CNPq/INPE LANDSAT system: Report of activities from October 1, 1983 to September 30, 1984 — Brazil [E85-10097] N85-27318
Study of the urban evolution of Brasilia with the use of LANDSAT data [E85-10101] N85-27321
The relevance of remote sensing to Brazil [INPE-3421-PRE/686] N85-27332
The ARGOS system in Brazil --- hydrology N85-27349
On the 1983 drought in northeast Brazil [INPE-3412-PRE/678] N85-27476
An appraisal of the duration of the recent drought in northeast Brazil and a forecast for 1985 [INPE-3477-PRE/720] N85-27478

BRAZILIAN SPACE PROGRAM
SELPER (Latin American Society of Remote Sensory Specialists) [INPE-3315-PRE/622] N85-27328

BREATHING APPARATUS
Hazards in welding due to oxygen changes in the workplace atmosphere [BLL-WI-TRANSL-684-(9312.57)] N85-27224

BREMSSTRAHLUNG
X-ray intensification at balloon altitudes of the South Atlantic magnetic anomaly in association with geomagnetic activity [INPE-3469-PRE/712] N85-27437

BRIDGMAN METHOD
Simulation of solidification in a Bridgman cell [NASA-CR-175838] N85-27705

BRIGHTNESS DISTRIBUTION
Possible period of Jovian activity and possibility of seasons N85-26810

BRIGHTNESS TEMPERATURE
The validation of sea surface temperatures determined from AVHRR data using in situ data recovered via system ARGOS N85-27342
Active and passive remote sensing of ice [AD-A151741] N85-27369
Atmospheric frontal zone studies [NASA-CR-175293] N85-27469

BRILLOUIN ZONES
Conducting a thermal conductivity survey [NASA-CR-175792] N85-27166

BROADCASTING
Optimal frequencies for broadcast transmitters in the UHF domain: Report [TUM-M8404] N85-27088
SESC (Space Environment Services Center) satellite broadcasting 10-year plan [PB85-163541] N85-27126
Generalized graph coloring: A frequency assignment method for VHF broadcasting [TUM-M8405] N85-27535

BROMIDES
Graphite fiber intercalation: Dynamics of the bromine intercalation process [NASA-TM-87015] N85-26921

BROMINE
Environmental stability of intercalated graphite fibers [NASA-TM-87025] N85-26992

BUDGETING
Manufacturing cost analysis of a parabolic dish concentrator (General Electric design) for solar thermal electric power systems in selected production volumes [NASA-CR-175772] N85-27380

BUFFETING
La Recherche Aerospatiale Bimonthly Bulletin, Number 1984-4, 221/July-August [ESA-TT-884] N85-26637
Wing buffeting active control testing on a transport aircraft configuration in a large sonic tunnel N85-26750

BULGARIA
Contribution to space program reviewed N85-26834

BUMPY TORUSES
Inherent magnetic field error measurements in ELMO Bumpy Torus [DE85-005855] N85-27685

BUOYS
Studies into location accuracy --- ARGOS system N85-27334
Positioning accuracy of the ARGOS system in operational use N85-27335
DB2 and DB3: The next generation --- buoys N85-27337
Development of a Lagrangian drifting buoy N85-27338
Long term drifting float for measuring mean oceanic circulation using ARGOS system N85-27339
ARGOS-tracked drifters in the Rockall Trough N85-27340
Monitoring of marine environment N85-27341
The validation of sea surface temperatures determined from AVHRR data using in situ data recovered via system ARGOS N85-27342
Wave directional spectra via ARGOS N85-27343

Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance N85-27344
Results of an initial trial of a satellite telemetering buoy measuring near surface current N85-27345
An operational buoy network collecting meteorological data N85-27351
Checking on the position of navigation marker buoys by the ARGOS system N85-27354
An inexpensive radar-responding relocation device for drifting oceanographic instruments [AD-A152170] N85-27505

BURGER EQUATION
On the relation between upwind-differencing schemes of Godunov, Engquist-Osher and Roe [NASA-CR-175805] N85-27583

BURNING RATE
The overall reaction concept in premixed, laminar, steady-state flames. 2: Initial temperatures and pressures [AD-A152132] N85-26944

BUSHINGS
Damping seal verification setup N85-26893

C

C-141 AIRCRAFT
Molecular spectroscopy from the Kuiper Airborne Observatory [NASA-CR-175748] N85-27783

CADASTRAL MAPPING
Application of the Siemens Computer Aided Computer (Sicad) system to the surveying management in Baden-Wuerttemberg N85-27361
Automatic engraving of map frames in the revision of the TK 25, 1:25,000 topographical map N85-27362

CALCIUM FLUORIDES
Spectroscopic investigation of materials for frequency agile laser systems [AD-A151731] N85-27208

CALCIUM ISOTOPES
Biological influences of low-frequency sinusoidal electromagnetic signals alone and superimposed on RF carrier waves [PB85-161248] N85-27527

CALCULUS OF VARIATIONS
Schubert varieties are arithmetically Cohen-Macaulay N85-27592

CALIBRATING
Qualification of a wall gage for the SIMA wagon, adapted to the test of half models motorized by compressed air turbines — SIMA wind tunnel [ONERA-PV-1/8068-GY] N85-26677
Management of vacuum leak-detection processes, standards and calibration [DE85-006705] N85-27202
NBS physical measurement services [NBSIR-84-2875] N85-27633
Calibration methods in millimeter-wave radioastronomy [INPE-3481-PRE/724] N85-27778

CALIFORNIA
Selection of promising sites for magma energy experiments [DE85-006832] N85-27393
Air quality benefit analysis for Los Angeles and San Francisco based on housing values and visibility [PB85-166049] N85-27409
Application of hierarchical data structures to geographical information systems [AD-A152169] N85-27753

CAMERAS
Errors in compensating for image oscillation by means of a gyroscopic head N85-27051

CANADA
AWS (Air Weather Service) climatic briefs: North America [AD-A152161] N85-27483
Investigation of the requirement for auxiliary heating of Canadian forces personnel [AD-A151950] N85-27522

CANARD CONFIGURATIONS
Description of a computer program treating transonic steady state aeroelastic effects for a canard or tail airplane [FFA-TN-1983-23] N85-26874

CANONICAL FORMS
Canonical analysis of the fermion sector in higher-derivative supergravity [DE85-007828] N85-27635

CANOPIES (VEGETATION)
Identification of structure of soil-vegetation cover using aerial and space photographs N85-26826
Radar return from vegetation covered terrains [INPE-3470-PRE/713] N85-27093
Modeling the backscattering and transmission properties of vegetation canopies [E85-10099] N85-27320

CANTILEVER BEAMS
Research and development of subsurface acoustic wave devices for sensor applications [AD-A152197] N85-27642

CAPILLARY FLOW
Special features of the temperature dependence of the capillary constant in the vicinity of the critical point [BLL-T6438/BG/LRS/LRST750/85] N85-27832

CARBON
Transitional metal activation and functionalization of C-H bonds [DE85-006816] N85-26849
Two-d heat transfer through porous media with heat generation [AD-A151965] N85-27173

CARBON DIOXIDE LASERS
Population inversion in laser-initiated vacuum arcs [AD-A151958] N85-27210

CARBON FIBER REINFORCED PLASTICS
Ultrasonic testing of carbon fiber reinforced plastics (CFRP) using pattern recognition methods [MBB-BB-563/84-0] N85-27726

CARBON FIBERS
Graphite fiber intercalation: Dynamics of the bromine intercalation process [NASA-TM-87015] N85-26921
Mechanical properties of high performance carbon fibers N85-26922
Environmental stability of intercalated graphite fibers [NASA-TM-87025] N85-26992
Fiber reinforcement of gun propellant [AD-A152296] N85-27014

CARBON MONOXIDE
The seasonal cycle of atmospheric CO in the Southern Hemisphere N85-27447

CARBON STEELS
Characteristics of polyacrylic acid-complexed zinc phosphate conversion films deposited on metal surfaces [DE85-004057] N85-26974

CARBON-CARBON COMPOSITES
Evaluation of the PSP resin as a precursor of carbon [ONERA-RT-11/1784-M] N85-26932

CARRIER MOBILITY
Heavy doping effects in high efficiency silicon solar cells [NASA-CR-175779] N85-27383

CASCADE FLOW
Proceedings of the NAL Symposium on Aircraft Computational Aerodynamics [NAL-SP-1] N85-26611
Two computational methods for cascade flows N85-26617
Numerical simulation of inviscid compressible flow through three-dimensional cascade N85-26619
Application of conformal mapping to grid generation N85-26621

CATALOGS (PUBLICATIONS)
Glossary of landscape and vegetation ecology for Alaska [PB85-153831] N85-27372

CATALYSTS
Improved catalysts for liquid hydrocarbon fuels from syngas [DE85-006569] N85-26947

CATHODE RAY TUBES
A description of the process of elaborating man-machine dialog in an aircraft equipped with cathode tubes: Roles and specifications of piloted simulation methods N85-26658

CATS
Percutaneous connectors [NASA-CR-175627] N85-27508

CAVITIES
Parametric study of autooscillation upon flow of supersonic jet into cylindrical cavity N85-27060

CAVITY RESONATORS
In situ microwave measurements of dielectric properties and moisture in materials [DE85-003822] N85-26953

CELESTIAL MECHANICS
Optimal open loop and nonlinear feedback control for remote orbital capture [AD-A151967] N85-26859

CELESTIAL REFERENCE SYSTEMS
Relating the planetary ephemerides and the radio reference frame N85-27095

CELLS (BIOLOGY)
Structural-functional changes in bacterial cells under spaceflight conditions N85-26812

CENTER OF MASS
Stability of periodic satellite motions relative to center of mass in circular orbit N85-26780
Satellite physical and orbital characteristics N85-27287

CENTRAL NERVOUS SYSTEM
Does a 50-cycle alternating field have central nervous effects? [BLL-CE-TRANS-8083-(9022.09)] N85-27507

CENTRAL PROCESSING UNITS
Use of vector processors in cartographic raster data processing, with special regard to the AP-120B vector processor N85-27358

CENTRIFUGAL FORCE
Aerodynamic forces developing in channels between vanes in turbine drive wheels N85-27062

CERAMIC COATINGS
Rocket thrust chamber thermal barrier coatings N85-26867
Simultaneous chemical vapor deposition of SiC-dispersed phase composites [DE85-007751] N85-26931

CERAMICS
Nondestructive tests of ceramic components for aircraft turbines N85-26718
Ceramics for advanced O2/H2 application N85-26868
Simultaneous chemical vapor deposition of SiC-dispersed phase composites [DE85-007751] N85-26931
Material for protection of metal surfaces against corrosion by molten salts [DE85-007714] N85-26968
Effects of wear on structure-sensitive magnetic properties of ceramic ferrite in contact with magnetic tape [NASA-TM-87007] N85-26991
Breakway friction and dynamic friction/wear measurements of various ceramic materials from 25 C (75 F) to 650 C (1200 F) [NASA-CR-174803] N85-26994
Ceramic technology for advanced heat engines project [DE85-004798] N85-27002
Screening ceramic materials for intense radiant heat applications [DE85-006989] N85-27006
Development of a new faster process for the fabrication of ceramic fiber-reinforced ceramic composites by chemical vapor infiltration [DE85-007550] N85-27007

CEREBRAL CORTEX
A communications link for an implantable electrode array [AD-A152238] N85-27510
A multipole model of the observed cerebral cortex magnetic field [AD-A152237] N85-27526

CERTIFICATION
Interactive design of specifications for airborne software set (GISELE) N85-26753
The certification of airborne complex digital systems N85-26754
Statistical study of the dynamic analysis of the workload in the A310 certification campaign N85-27531

CH-47 HELICOPTER
A modern control design methodology with application to the CH-47 helicopter [AD-A151946] N85-26723

CHAFF
An empirical self-protection chaff model [AD-A151928] N85-27115

CHANNELS (DATA TRANSMISSION)
A study of topologies and protocols for fiber optic local area network [NASA-CR-175771] N85-27669

CHARACTER RECOGNITION
Character recognition using correlation techniques [AD-A152006] N85-27549

CHARGE COUPLED DEVICES
INPE's line imaging camera: Preliminary results [INPE-3476-PRE/719] N85-27194

CHARGE TRANSFER
Theory of electron-impact atomic ionization cross sections [AD-A151763] N85-27648

CHEBYSHEV APPROXIMATION
H-sets, convex programming and constrained approximation [TRITA-NA-8308] N85-27587

CHEMICAL ANALYSIS
Development of a persistent chemical agent simulation system [NASA-CR-175780] N85-26937
Development of a Persistent Chemical Agent Simulator System (PCASS) [NASA-CR-175776] N85-26938

Design of a Mobile Combustion Diagnostic Fixture (MCDF)
[AD-A151814] N85-26941

CHEMICAL BONDS
Transitional metal activation and functionalization of C-H bonds
[DE85-006816] N85-26949

CHEMICAL COMPOSITION
Technical and economic analysis of liquid fuel production from microalgae
[DE85-002926] N85-27018

CHEMICAL EXPLOSIONS
Measurements of two-phase exhaust flow parameters of a small caliber gun associated with muzzle flash phenomena
[ISL-CO-212/83] N85-27182

CHEMICAL LASERS
Short Wavelength Chemical Laser (SWCL) Workshop
[AD-A151959] N85-27211

CHEMICAL REACTIONS
Development of a persistent chemical agent simulation system
[NASA-CR-175780] N85-26937
Development of a Persistent Chemical Agent Simulator System (PCASS)
[NASA-CR-175776] N85-26938
Fluorinated polyesters
[AD-D011611] N85-26988
Dual electrochemical system
[AD-D011616] N85-27376
Evaluation of chemical reaction mechanisms for photochemical smog. Part 2: Quantitative evaluation of the mechanisms, revised
[PB85-166090] N85-27408
Atmospheric chemistry
[INPE-3190-PRE/554] N85-27430

CHEMICAL WARFARE
Development of a persistent chemical agent simulation system
[NASA-CR-175780] N85-26937
Development of a Persistent Chemical Agent Simulator System (PCASS)
[NASA-CR-175776] N85-26938

CHINA
China report: Science and Technology
[JPRS-CST-85-012] N85-27300

CHIPS (ELECTRONICS)
An integrated UNIX-based CAD system for the design and testing of custom VLSI chips N85-27102

CHIRAL DYNAMICS
Comment on quantum effects on 4-dimensional space-time symmetries
[DE85-007780] N85-27722

CHLORINE OXIDES
Stratospheric ClO: In-situ detection with a new approach N85-27416

CHROMIUM
Positron annihilation studies of vacancy formation in tungsten, chromium, and niobium
[DE85-006837] N85-27710

CHROMIUM OXIDES
Test and modeling for sintering theory
[DE85-007761] N85-27004

CIRCUITS
Distributed control of circuits in multiuser communication networks with circuit precedence and path suitability criteria using failsafe routing concepts
[AD-A151825] N85-27113

CIRCULAR CYLINDERS
Flow around rotating and nonmoving circular cylinder near flat screen. Report 1: Aerodynamic forces in cylinder N85-27059
Boundary layer at moving cylinder surface N85-27064
On residual stress in an elastic body N85-27248

CIRCULAR ORBITS
Stability of periodic satellite motions relative to center of mass in circular orbit N85-26780

CITIES
Experience of the Institute of Space Research with the use of remote sensing in urban planning studies
[INPE-3159-PRE/533] N85-27770

CLADDING
Investigation of the influence of some paint systems and water displacing corrosion inhibitors on anodic undermining corrosion of aluminum 2024 clad alloy — aircraft structures
[VTH-LR-443] N85-27009

CLASSIFICATIONS
Criteria for the classification of hydrographic positioning data
[AD-A152263] N85-26997
Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms
[INPE-3359-PRE/637] N85-27545

CLAYS
Low pressure storage of methane on interlayered clays for potential vehicular applications
[DE85-006949] N85-27017

CLEARANCES
Effects of bearing deadbands on bearing loads and rotor stability N85-26889

CLIMATE
Regularities in recent changes in surface air temperature and atmospheric precipitaion fields N85-27311
Ecology of Pamlico River, North Carolina: An estuarine profile
[PB85-155703] N85-27404
AWS (Air Weather Service) climatic briefs: Asia
[AD-A151944] N85-27481
AWS (Air Weather Service) climatic briefs: North America
[AD-A152161] N85-27483
A climatic data bank for Northern Hemisphere land areas, 1851-1980
[DE85-007863] N85-27486
Intercomparison of Radiation Codes in Climate Models (ICRCCM)
[DE85-007251] N85-27487
Preliminary assessment of climatic change during late Wisconsin time, southwest Great Basin and vicinity, Arizona, California and Nevada
[DE85-008343] N85-27488

CLIMATOLOGY
Evaluation of the area and severity of last night's frosts
[REPT-109] N85-27473
Geophysical monitoring for climatic change, number 12
[PB85-172276] N85-27496
NASA Oceanic Processes Program annual review
[NASA-TM-87565] N85-27503

CLINICAL MEDICINE
Thermal consequences of localized SAR from RFR exposures N85-27130
Diagnostic system
[INPE-3350-PRE/659] N85-27519

CLOCKS
Maintenance of time and frequency in the DSN using the global positioning system N85-27105

CLOUD COVER
Symposium on Atmospheric Sciences in South Africa
[CSIR-S-331] N85-27442
A modeling analysis program for the JPL table mountain lo sodium cloud
[NASA-CR-175851] N85-27468
AWS (Air Weather Service) climatic briefs: Asia
[AD-A151944] N85-27481

CLOUD PHOTOGRAPHY
Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones
[PB85-164994] N85-27499

CLOUD PHYSICS
The use of radar in determining precipitation processes in the BEWMEX area N85-27455
Effects of cloud seeding on precipitation development in cumulus clouds N85-27456
Cloud physics studies in the SCPP (Sierra Cooperative Pilot Project)
[PB85-163095] N85-27501

CLOUD SEEDING
Cloud-seeding for regulating precipitaion in Moscow area N85-27308
Effects of cloud seeding on precipitation development in cumulus clouds N85-27456
SCPP (Sierra Cooperative Pilot Project) Forecasting Support N85-27493
Cloud physics studies in the SCPP (Sierra Cooperative Pilot Project)
[PB85-163095] N85-27501

CLOUDS
SAM II measurements of the polar stratospheric aerosol. Volume 6: April to October 1981
[NASA-RP-1141] N85-27422
Evolution of stratospheric aerosol size distribution from ground-based radiometric measurements: A study of El Chichon aerosol
[DE85-007555] N85-27439

CLOUDS (METEOROLOGY)
The development and application of volume scan and cell tracking capabilities for the analysis of convective cloud systems N85-27451
Cloud physics studies in the SCPP (Sierra Cooperative Pilot Project)
[PB85-163095] N85-27501

CLUTTER
A short range, high accuracy radar ranging system
[AD-A152195] N85-27122

COASTAL CURRENTS
The sea level response to weather along the coast of southern Africa N85-27446
Atmospherically forced, coastally trapped, long period gravity waves off the south coast of southern Africa N85-27461
Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters
[INPE-3492-PRE/729] N85-27504

COASTAL ECOLOGY
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405

COASTAL WATER
Diffusion coefficients for coastal water determined from aerial photographs
[INPE-3413-PRE/679] N85-27331
The sea level response to weather along the coast of southern Africa N85-27446
Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters
[INPE-3492-PRE/729] N85-27504

COASTS
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405

COATINGS
Tooth wear in worm gears in vacuum N85-27070
Development of a polystyrene insulation system
[DE85-006950] N85-27180

COCHLEA
Measurement of cochlear acoustic pressure in guinea pigs
[ISL-CO-234/83] N85-27644

COCKPITS
A comparison of pictorial and speech warning messages in the modern cockpit
[AD-A151917] N85-26706
The introduction of new cockpit technology: A human factors study
[NASA-TM-86659] N85-27528
Trends shaping advanced aircrew training capabilities through the 1990s
[AD-A152277] N85-27530

CODING
Recent trends in software technology for vector processors N85-26615
DoD manual for standard data elements, part 1
[AD-A152201] N85-27754

COEFFICIENTS
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172

COGNITION
Effects of dehydration or cold exposure and restricted fluid intake upon cognitive performance
[AD-A151973] N85-27525

COHERENT ELECTROMAGNETIC RADIATION
High energy particle acceleration by coherent electromagnetic waves propagating across the magnetic field
[IPPJ-717] N85-27679

COHERENT RADIATION
Studies of collisional and nonlinear radiative process for development of coherent UV and XUV sources
[AD-A152001] N85-27670

COLD ACCLIMATIZATION
Predictors of cold weather health behaviors
[AD-A151910] N85-27529

COLD FLOW TESTS
Contribution to the study of equivalent noise source identification in fast cold jets
[ISL-R-114/83] N85-27645

COLD WATER
SCPP (Sierra Cooperative Pilot Project) data collection and analysis. Volume 1: Executive summary
[PB85-156065] N85-27494

COLD WEATHER
Investigation of the requirement for auxiliary heating of Canadian forces personnel
[AD-A151950] N85-27522
Predictors of cold weather health behaviors
[AD-A151910] N85-27529

COLD WORKING
Calculating reliability and productivity of cold stamping robot complex as queuing system N85-27039

COLLECTION
Acid rain: Towards automated monitoring N85-27444

Evaluation of a field expedient technique for sweat sample collection
[AD-A151916] N85-27521
COLLIMATION
Distortion functions
[DE85-007511] N85-27655
COLLISION AVOIDANCE
Aircraft accident report: United Airlines Flight 663, Boeing 727-222, N7647U, Denver, Colorado, May 31, 1984
[PB85-910405] N85-26686
COLLISIONS
Refinements in the computation of collision probabilities
[DE85-006118] N85-27663
COLOR CENTERS
Polarimetric image recorder
[AD-D011605] N85-27192
COLORADO
Evaluation of the PROFS (Program for Regional Observing and Forecasting Services) 1982, real-time forecast experiment
[PB85-159747] N85-27495
COMBAT
Piloted simulation of one-on-one helicopter air combat at NOE flight levels
[NASA-TM-86686] N85-26720
The STOL and maneuver technology program integrated control system N85-26757
COMBINATORIAL ANALYSIS
Combinatorial performance/cost analysis of an autonomous navigation system for aircraft N85-26640
COMBUSTIBLE FLOW
Error reduction program — combustor performance evaluation codes
[NASA-CR-174776] N85-27584
COMBUSTION
Ignition of metals in high pressure oxygen N85-26874
Ignition/combustion processes N85-26909
Laser Schlieren and ultraviolet diagnostics of rocket combustion N85-26911
COMBUSTION CHAMBERS
Analytical fuel property effects--small combustors
[NASA-CR-174736] N85-26709
Turbulence characteristics of swirling flowfields
[NASA-CR-174918] N85-26717
Study of the primary zone of gas turbine hearths
[ONERA-RTS-22/3256-EY] N85-26719
Advanced High Pressure O2/H2 Technology
[NASA-CP-2372] N85-26862
Thrust chamber life prediction N85-26865
Rocket thrust chamber thermal barrier coatings N85-26867
Liquid rocket combustor computer code development N85-26910
Laser Schlieren and ultraviolet diagnostics of rocket combustion N85-26911
Solid fuel combustion chamber
[VTH-LR-415] N85-26918
Solid fuel combustion chamber
[VTH-LR-438] N85-26919
Solid fuel combustion chamber research in the Netherlands
[VTH-LR-444] N85-26920
Design of a Mobile Combustion Diagnostic Fixture (MCDF)
[AD-A151814] N85-26941
Error reduction program — combustor performance evaluation codes
[NASA-CR-174776] N85-27584
COMBUSTION CONTROL
Nonintrusive shaft speed sensor N85-26908
COMBUSTION PHYSICS
Solid fuel combustion chamber
[VTH-LR-415] N85-26918
Solid fuel combustion chamber
[VTH-LR-438] N85-26919
COMBUSTION PRODUCTS
Transformation of nitrogen oxides while sampling combustion products
[AD-A152184] N85-26945
Analytical methods for determination of POHC (Principal Organic Hazardous Constituents) in combustion products
[PB85-161578] N85-26955
The remote detection of polynuclear aromatic hydrocarbons using laser-induced fluorescence
[AD-A152294] N85-27013
COMBUSTION TEMPERATURE
Nonintrusive shaft speed sensor N85-26908
COMETARY ATMOSPHERES
Cometary atmospheres: Modeling the spatial distribution of observed neutral radicals
[NASA-CR-175852] N85-27761
COMETS
Radio observations of comet P/Crommelin
[INPE-3480-PRE/723] N85-27777
COMMAND AND CONTROL
Automated CPX support system preliminary design phase
[NASA-CR-175784] N85-27091
COMMERCIAL AIRCRAFT
Demonstration of relaxed stability on a commercial transport N85-26745
Realisation of relaxed static stability on a commercial transport N85-26746
COMMUNICATION
White paper on new international satellite systems
[PB85-162501] N85-27127
COMMUNICATION NETWORKS
Design and specification of a local area network architecture for use in real-time flight simulation
[AD-A152242] N85-26762
Distributed control of circuits in multiuser communication networks with circuit precedence and path suitability criteria using failsafe routing concepts
[AD-A151825] N85-27113
Evaluation of Ada (trademark) as a communications programming language, volume 1
[AD-A152314] N85-27559
Evaluation of Ada (trademark) as a communications programming language. Volume 2: Communications protocols application
[AD-A152315] N85-27560
Evaluation of Ada (trademark) as a communications programming language. Volume 3: Trusted software application
[AD-A152316] N85-27561
A study of topologies and protocols for fiber optic local area network
[NASA-CR-175771] N85-27669
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762
COMMUNICATION SATELLITES
Satellite provided customer promises services, a forecast of potential domestic demand through the year 2000. Volume 4: Sensitivity analysis
[NASA-CR-174662] N85-27092
COMMUNITIES
Air quality benefit analysis for Los Angeles and San Francisco based on housing values and visibility
[PB85-166049] N85-27409
COMPACTING
Rapid solidification of candidate ferritic steels
[DE85-006596] N85-26971
COMPENSATORS
Flight control system reconfiguration design using quantitative feedback theory
[AD-A151771] N85-26722
COMPONENT RELIABILITY
Cost prediction model for various payloads and instruments for the Space Shuttle Orbiter
[NASA-CR-175781] N85-26842
Component-specific modeling
[NASA-CR-174765] N85-27261
COMPOSITE FUNCTIONS
The nonlinear analysis of thick composite plates using a cubic spline function
[AD-A152115] N85-27268
COMPOSITE MATERIALS
Simultaneous chemical vapor deposition of SiC-dispersed phase composites
[DE85-007751] N85-26931
The nonlinear analysis of thick composite plates using a cubic spline function N85-27252
The nonlinear analysis of thick composite plates using a cubic spline function
[AD-A152115] N85-27268
COMPOSITE STRUCTURES
Directional thermal conductivities of graphite-epoxy composites: 0/90 and 0/+ or - 45/90
[AD-A152209] N85-26929
COMPRESSED AIR
Qualification of a wall gage for the SIMA wagon, adapted to the test of half models motorized by compressed air turbines — SIMA wind tunnel
[ONERA-PV-1/8068-GY] N85-26677
COMPRESSIBLE FLOW
Numerical simulation of inviscid compressible flow through three-dimensional cascade N85-26819
Recent progress in computational aerodynamics N85-26526
LU methods for the compressible Navier-Stokes equations N85-27160
An experimental study of compressible turbulent reattaching free shear layers N85-27161
Solution of Onsager's equation for a rotating compressible fluid in a multiply-connected domain
[DE85-007048] N85-27178
A four-field model for Tokamak plasma dynamics
[DE85-007111] N85-27694
COMPTON EFFECT
A synchrotron/inverse Compton interpretation of a solar burst producing fast pulses at lambda 3 mm and hard X-rays N85-27815
COMPUTATION
Recent progress in computational aerodynamics N85-26526
Techniques for computing the DFT using the residue Fermat number systems and VLSI N85-27097
Management of vacuum leak-detection processes, standards and calibration
[DE85-006705] N85-27202
Error reduction program — combustor performance evaluation codes
[NASA-CR-174776] N85-27584
Nonlinear DSA difference schemes for radiative transfer applications
[DE85-005729] N85-27611
Optimizing computational efficiency and user convenience in plasma simulation codes
[DE85-007661] N85-27682
COMPUTATIONAL FLUID DYNAMICS
Proceedings of the NAL Symposium on Aircraft Computational Aerodynamics
[NAL-SP-1] N85-26611
Some numerical analyses of flows with separation N85-26616
Two computational methods for cascade flows N85-26617
The role of computational fluid dynamics in aeronautical engineering N85-26629
A method for simulating 3-D aircraft flow fields with jet plume effects
[NASA-CR-175802] N85-26664
Low Reynolds number vehicles
[AGARD-AG-288] N85-26666
Application of CFD techniques toward the validation of nonlinear aerodynamic models
[NASA-TM-88715] N85-26671
A numerical simulation of the NFAC (National Full-scale Aerodynamics Complex) open-return wind tunnel inlet flow
[NASA-TM-86724] N85-26672
Numerical solution of transonic normal shock wave-boundary layer interaction using the Bohning-Zierop model — wind tunnel flow
[VTH-LR-416] N85-26683
Solid fuel combustion chamber
[VTH-LR-415] N85-26918
Solid fuel combustion chamber
[VTH-LR-438] N85-26919
Turbulent flow of fluid near trailing edge of plate in stream at zero angle of attack N85-27057
LU methods for the compressible Navier-Stokes equations N85-27160
Theoretical investigation of three-dimensional shock wave turbulent boundary layer interactions. Part 3
[AD-A152251] N85-27177
The development of a computational model for a two-dimensional turbulent flow. Part 1: Mathematical background — solid fuel combustion
[VTH-LR-436-PT-1] N85-27188
Adaptive grid generation for numerical solution of Burger's equation
[AD-A152217] N85-27606
COMPUTATIONAL GRIDS
Application of conformal mapping to grid generation N85-26621
Local uniform mesh refinement on loosely-coupled parallel processors
[AD-A152199] N85-27571
Adaptive grid generation for numerical solution of Burger's equation
[AD-A152217] N85-27606
COMPUTER AIDED DESIGN
Computational aerodynamics for aircraft wing design N85-26627
A numerical design method for three-dimensional transonic wings N85-26631
Three-dimensinal wing boundary layer analysis program BLAY and its application N85-26632
Design-To-Cost (DTC) methodology to achieve affordable avionics N85-26645
A modern control design methodology with application to the CH-47 helicopter
[AD-A151946] N85-26723
Status, prospects of computer-aided design discussed N85-27073
An integrated UNIX-based CAD system for the design and testing of custom VLSI chips N85-27102
Development and application of optimum sensitivity analysis of structures
[NASA-CR-175857] N85-27257

China report: Science and Technology
[JPRS-CST-85-012] N85-27300
Fujian forges ahead in electronic production
N85-27301
The systematic integration of very large scale integrated circuit computer-aided design tools into a toolkit optimized for academic applications
[AD-A151813] N85-27538
Further development of an Interactive Control Engineering Computer Analysis Package (ICECAP) for discrete and continuous systems
[AD-A151783] N85-27546
Manufacturing methods and technology CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) related efforts (FY 1980 - 1986)
[AD-A151817] N85-27547
Numerical optimization algorithm for engineering problems using microcomputer
[AD-A152135] N85-27554
Mathematical programming in computer network design
[AD-A152275] N85-27558
Mapping principles for the standards interface for computer aided design
[PB85-177905] N85-27566
The application of computer aided structural optimization to the design of aircraft components
[MBB-UT-21/84-O] N85-27728
NBS (National Bureau of Standards) research reports
[PB85-127421] N85-27764

COMPUTER AIDED MANUFACTURING
Method of selecting robotized system design for pressing process N85-27040
Experience of sheet stamping robotic complexes
N85-27041
Robotic thermal battery pellet fabrication
[DE85-007755] N85-27154
Fujian forges ahead in electronic production
N85-27301
Manufacturing methods and technology CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) related efforts (FY 1980 - 1986)
[AD-A151817] N85-27547

COMPUTER AIDED MAPPING
Reports on cartography and geodesy. Series 1: Original reports, no. 94
[ISSN-0469-4236] N85-27357
Use of vector processors in cartographic raster data processing, with special regard to the AP-120B vector processor N85-27358
Testing of scanner-assisted revision of the topographic map 1:25,000 (TK 25) N85-27359
Realization of cartographic tasks on the multiprocessor system EGPA — image processing N85-27360
Application of the Siemans Computer Aided Computer (Sicad) system to the surveying management in Baden-Wuerttemberg N85-27361
Automatic engraving of map frames in the revision of the TK 25, 1:25,000 topographical map N85-27362
Application of interactive graphic systems in land consolidation. Processing of planning maps
N85-27363
A concept for map updating using digital image processing methods N85-27364
Raster or vector processing. Experience with the application of programs for the construction of thematic maps with boundary design in the Lower Saxony (West Germany) Land Administration for ground research
N85-27365
Status of computer aided mapping in hydrographic services N85-27366
Contour line generalization using digital image processing methods N85-27367
What does digital image processing perform in the production of orthophotomaps N85-27368
A graphic system for drawing synoptic maps by computer
[INPE-3215-PRE/568] N85-27474

COMPUTER DESIGN
Recent advances in supercomputers N85-26625

COMPUTER GRAPHICS
Graphic simulation of a machine-repairman model
[AD-A151761] N85-26633
Criteria for the classification of hydrographic positioning data
[AD-A152283] N85-26697
Development of a graphic system: Example using the outline of synoptic charts
[INPE-3296-PRE/611] N85-27327
Application of interactive graphic systems in land consolidation. Processing of planning maps
N85-27363
SINOGRAFO: A system for influencing and forecasting weather
[INPE-3349-PRE/628] N85-27475
Development of computer aided database design and maintenance tools
[AD-A151782] N85-27537
Span graphics display utilities handbook, first edition
[NASA-TM-86500] N85-27567
A fast hidden line algorithm with contour option
[NASA-CR-175803] N85-27582
An interpolation method with the possibility of first derivative correction
[INPE-3352-PRE/631] N85-27590
Surface interpolation using weighted splines
[INPE-3387-PRE/658] N85-27591

COMPUTER INFORMATION SECURITY
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762

COMPUTER NETWORKS
Maintaining consistency and accommodating network repair in a self-regenerative distributed database management system (a discussion of the means and cost) N85-26656
East Europe report: Science and technology
[JPRS-ESA-84-032] N85-26833
Network information management subsystem
N85-27106
Standards and specifications for geodetic control networks
[PB85-166478] N85-27374
Mathematical programming in computer network design
[AD-A152275] N85-27558
Span graphics display utilities handbook, first edition
[NASA-TM-86500] N85-27567
Continued development and implementation of the Universal Network Interface Device (UNID) 2, Digital Engineering Laboratory Network (DELNET), volume 1
[AD-A151935] N85-27569
Continued development and implementation of the Universal Network Interface Device (UNID) 2 in the Digital Engineering Laboratory Network (DELNET), volume 2
[AD-A151947] N85-27570
Internation information networks for material properties: Revision 1
[DE85-007412] N85-27572
Access path optimization for network database retrieval N85-27749
Design of an interface to an information retrieval network N85-27750

COMPUTER PROGRAM INTEGRITY
Management aspects of software maintenance
[AD-A152035] N85-27550

COMPUTER PROGRAMMING
Automatic manipulators for forging rollers N85-27042
A heuristic solution to the spacing problem: Maximizing the minimum Euclidean distance among N points in a convex region
[AD-A152116] N85-27603
Management considerations for an information center
[AD-A151774] N85-27742

COMPUTER PROGRAMS
Proceedings of the NAL Symposium on Aircraft Computational Aerodynamics
[NAL-SP-1] N85-26611
Computer software for aerodynamic design of aircraft developed within the National Aerospace Laboratory
N85-26613
Recent trends in software technology for vector processors N85-26615
A computer program for the drag prediction of subsonic, turbine powered aircraft in the en-route configuration
[VTH-LR-412] N85-26681
Generation of flight paths using heuristic search
[AD-A151949] N85-26694
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 2. Program compilation
[AD-A152271] N85-26703
Confined turbulent swirling recirculating flow predictions
[NASA-CR-174917] N85-26716
The effect of load factor on aircraft handling qualities
[AD-A152118] N85-26724
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 1: Program compilation
[AD-A152270] N85-26727
A modular dissimilar redundant computer designed for high integrity control N85-26751
Interactive design of specifications for airborne software set (GISELE) N85-26753
The flight control system for the Experimental Aircraft Programme (EAP) demonstrator aircraft N85-26755
Flight Experiment Demonstration System (FEDS) functional description and interface document
[NASA-CR-175290] N85-26769
The effect of inaccuracies in structural models on the control of large space structures
[AD-A151794] N85-26858
Application of the hydraulic system frequency response program to propellant feed systems
[AD-A151824] N85-26914
Paramagnetic form factors from itinerant electron theory
[DE85-005272] N85-26973
The design of an English word-processor for scientific and technical use in which superscripts, subscripts and Greek characters are operated by screen-edit. 3
N85-27025
East Europe report: Science and technology
[JPRS-ESA-85-019] N85-27077
Evaluating syntactic constraints to speech recognition in a fighter aircraft environment
[AD-A152117] N85-27119
An analysis of data dictionaries and their role in information resource management
[AD-A152134] N85-27121
A study of computational techniques for noncanonical microstrip antennas and arrays
[AD-A152216] N85-27123
Computer program for the calculation of multicomponent convective diffusion deposition rates from chemically frozen boundary layer theory
[NASA-CR-168329] N85-27164
A general simulation program for robot manipulator arm dynamics
[AD-A152121] N85-27230
Automatic tracking of crack growth via finite elements
N85-27246
Development and application of optimum sensitivity analysis of structures
[NASA-CR-175857] N85-27257
Component-specific modeling
[NASA-CR-174765] N85-27261
Stress analysis of the space telescope focal plane structure joint
[NASA-CR-175797] N85-27284
Gravity model development software status
N85-27289
Development of computer aided database design and maintenance tools
[AD-A151782] N85-27537
The systematic integration of very large scale integrated circuit computer-aided design tools into a toolkit optimized for academic applications
[AD-A151813] N85-27538
Forward library searching of previously-quantitated peaks, using a scan list created from a quantitation list by a novel FORTRAN program for the INCOS data system
[PB85-165835] N85-27541
Further development of an Interactive Control Engineering Computer Analysis Package (ICECAP) for discrete and continuous systems
[AD-A151783] N85-27546
Numerical optimization algorithm for engineering problems using microcomputer
[AD-A152135] N85-27554
Development of graphical pole-zero, root-locus, Bode, Nyquist, and Nichols responses using the OPTSYSX program
[AD-A152148] N85-27555
Development of graphical time response using the OPTSYSX program
[AD-A152221] N85-27557
Evaluation of Ada (trademark) as a communications programming language, volume 1
[AD-A152314] N85-27559
Evaluation of Ada (trademark) as a communications programming language. Volume 2: Communications protocols application
[AD-A152315] N85-27560
Evaluation of Ada (trademark) as a communications programming language. Volume 3: Trusted software application
[AD-A152316] N85-27561
Incorporation of an elliptical boundary condition into the program POISSON
[DE85-006820] N85-27564
Continued development and implementation of the Universal Network Interface Device (UNID) 2 in the Digital Engineering Laboratory Network (DELNET), volume 2
[AD-A151947] N85-27570
Error reduction program — combustor performance evaluation codes
[NASA-CR-174776] N85-27584
A decomposition procedure for convex quadratic programs
[AD-A151732] N85-27595
UTM (Universal Transverse Mercator) determinations from geographical data
[AD-A152293] N85-27610

Computer assisted flight schedule optimization
[AD-A151689] N85-27623
Optimizing computational efficiency and user convenience in plasma simulation codes
[DE85-007661] N85-27682
Tokamak systems code
[DE85-008147] N85-27696
Management considerations for an information center
[AD-A151774] N85-27742

COMPUTER STORAGE DEVICES
A general purpose scatter storage subsystem and a comparison of hashing methods
[NASA-CR-175814] N85-27542

COMPUTER SYSTEMS DESIGN
Reusable software: A concept for cost reduction N85-26655
Active control technology: Past, present, future N85-26731
Automated CPX support system preliminary design phase
[NASA-CR-175784] N85-27091
Use of vector processors in cartographic raster data processing, with special regard to the AP-120B vector processor N85-27358
Detailed design of an object oriented, multiprogramming, multitasking operating system for sixteen-bit microcomputers
[AD-A152086] N85-27552
Continued development and implementation of the Universal Network Interface Device (UNID) 2, Digital Engineering Laboratory Network (DELNET), volume 1
[AD-A151935] N85-27569

COMPUTER SYSTEMS PROGRAMS
Reusable software: A concept for cost reduction N85-26655
Description of a computer program treating transonic steady state aeroelastic effects for a canard or tail airplane
[FFA-TN-1983-23] N85-26674
Computation model of turbulent free flow: Application to axisymmetric jets
[ISL-R-126/83] N85-27185
Raster or vector processing. Experience with the application of programs for the construction of thematic maps with boundary design in the Lower Saxony (West Germany) Land Administration for ground research N85-27365
Generalized graph coloring: A frequency assignment method for VHF broadcasting
[TUM-M8405] N85-27535
Management aspects of software maintenance
[AD-A152035] N85-27550
Proposal for an extended set of FORTRAN Basic Linear Algebra subprograms
[DE85-007241] N85-27562
Formulation of a coherent light-sheet by means of a cylindrical-spherical optical system
[ISL-R-116/83] N85-27674
Software for reflectivity calculations of X-ray mirrors, revision 1
[DE85-006642] N85-27688

COMPUTER TECHNIQUES
Computer software for aerodynamic design of aircraft developed within the National Aerospace Laboratory N85-26613
Planning fuel-conservative descents in an airline environmental using a small programmable calculator: Algorithm development and flight test results
[NASA-TP-2393] N85-26705
The design of an English word-processor for scientific and technical use in which superscripts, subscripts and Greek characters are operated by screen-edit. 3 N85-27025
China report: Science and Technology
[JPRS-CST-85-012] N85-27300
New image deblurring method described N85-27305
A wind-bivane/microprocessor system for on-line prediction and display of pollutant distributions N85-27449
The development and application of volume scan and cell tracking capabilities for the analysis of convective cloud systems N85-27451
Incorporation of an elliptical boundary condition into the program POISSON
[DE85-006820] N85-27564
Finite elements and the method of conjugate gradients on a concurrent processor
[NASA-CR-175812] N85-27588
Adaptive grid generation for numerical solution of Burger's equation
[AD-A152217] N85-27606

COMPUTER VISION
Positioning of a robotic manipulator through the use of visual feedback
[AD-A151933] N85-27577

COMPUTERIZED SIMULATION
Numerical simulation of inviscid compressible flow through three-dimensional cascade N85-26619
Numerical simulation of transonic flutter of a high-aspect ratio transport wing N85-26630
Graphic simulation of a machine-repairman model
[AD-A151761] N85-26633
Simulation: A tool for cost-effective systems design and live test reduction N85-26657
Generalized escape system simulation: Its purpose, recent modifications and potential
[DE85-005571] N85-26689
Study of the primary zone of gas turbine hearths
[ONERA-RTS-22/3256-EY] N85-26719
The effect of load factor on aircraft handling qualities
[AD-A152118] N85-26724
Probabilistic computer model of optimal runway turnoffs
[NASA-CR-172549] N85-26760
A SLAM II simulation model for analyzing space station mission processing requirements
[NASA-CR-175664] N85-26853
Ignition/combustion processes N85-26909
Liquid rocket combustor computer code development N85-26910
Laser Schlieren and ultraviolet diagnostics of rocket combustion N85-26911
Influence of behavior laws in the explosive deformation of metal plates
[ISL-R-122/83] N85-27032
Automated CPX support system preliminary design phase
[NASA-CR-175784] N85-27091
A software simulation study of a sequential decoder using the Fano algorithm N85-27100
An empirical self-protection chaff model
[AD-A151928] N85-27115
Radiation and scattering of spiral antennas
[AD-A151929] N85-27116
Pulsewidth modulated speed control of brushless dc motors
[AD-A151966] N85-27148
Electrical resistivity in amorphous metals: Consequences of phonon ineffectiveness in the diffraction model
[AD-A152130] N85-27150
Computer modeling of vibrational energy levels of potential laser candidates (diatomic molecules)
[AD-A151765] N85-27209
A general simulation program for robot manipulator arm dynamics
[AD-A152121] N85-27230
Numerical resolution calculation for elastic-plastic impact problems
[AD-A152292] N85-27270
Hopkinson bar simulation using DYNA2D
[DE85-006766] N85-27275
Diagnostic system
[INPE-3350-PRE/659] N85-27519
A multipole model of the observed cerebral cortex magnetic field
[AD-A152237] N85-27526
Parallel time O(log N) acceptance of deterministic CFLs
[AD-A152255] N85-27539
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology
[AD-A151956] N85-27548
Development of graphical pole-zero, root-locus, Bode, Nyquist, and Nichols responses using the OPTSYSX program
[AD-A152148] N85-27555
Kinematic rate control of simulated robot hand at or near wrist singularity
[NASA-TP-2440] N85-27575
The NAVTAG (Naval Tactical Game) system and its modification to include the SH-60B helicopter
[AD-A152004] N85-27624
LIGHT: A ray tracing code to simulate light collection in scintillation spectrometers and light pipes
[DE85-007213] N85-27673
Optimizing computational efficiency and user convenience in plasma simulation codes
[DE85-007661] N85-27682
Fundamentals of plasma simulation
[DE85-007699] N85-27683
Tokamak systems code
[DE85-008147] N85-27696
Electronic density of states for the double donor system SiP, As
[INPE-3447-PRE/700] N85-27700

COMPUTERS
Computer software for aerodynamic design of aircraft developed within the National Aerospace Laboratory N85-26613
Design of computer-related workstations in relation to job functions and productivity
[AD-A151938] N85-27534
Squeezing the most out of Eigenvalue solvers on high-performance computers
[DE85-007569] N85-27565

CONCENTRATION (COMPOSITION)
On the analytic calculation of premixed flames
[VTH-LR-417] N85-26954
Comparison of observed and predicted short-term tracer-gas concentrations in the atmosphere
[DE85-007566] N85-27399
Evaluation of chemical reaction mechanisms for photochemical smog. Part 2: Quantitative evaluation of the mechanisms, revised
[PB85-166080] N85-27406
Radon concentration inversion in the troposphere: Still unexplained
[INPE-3360-PRE/638] N85-27431

CONCRETES
Repair of the DSS-14 pedestal concrete N85-27106
Hopkinson bar simulation using DYNA2D
[DE85-006766] N85-27275

CONDENSERS (LIQUEFIERS)
Filmwise condensation of steam on low integral-finned tubes
[AD-A152220] N85-27176

CONDUCTIVE HEAT TRANSFER
Conducting a thermal conductivity survey
[NASA-CR-175792] N85-27166

CONDUCTIVITY
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26965

CONFERENCES
Proceedings of the NAL Symposium on Aircraft Computational Aerodynamics
[NAL-SP-1] N85-26611
Technical evaluation report on the Flight Mechanics Symposium on Active Control Systems: Review, Evaluation and Projections
[AGARD-AR-220] N85-26730
Tenth Conference of Working Group of Socialist Countries on Remote Sensing of Earth under Intercosmos Program N85-26820
Advanced High Pressure O2/H2 Technology
[NASA-CP-2372] N85-26862
Sixth DOE Electrochemical Contractor's Review. Extended abstracts
[DE84-013679] N85-27151
Short Wavelength Chemical Laser (SWCL) Workshop
[AD-A151959] N85-27211
Data Collection and Platform Location by Satellite: ARGOS Users' Conference N85-27333
Proceedings of the Workshop on Polarized Targets in Storage Rings
[DE85-002704] N85-27653

CONFIDENCE LIMITS
Criteria for the classification of hydrographic positioning data
[AD-A152263] N85-26607

CONFORMAL MAPPING
Application of conformal mapping to grid generation N85-26621
Conditions for the possibility of conformal sewing
[ST-AASF-IMD-58] N85-27625

CONGRESSIONAL REPORTS
The impact of weather on aviation safety
[GPO-35-520] N85-26685
Recent failures of weather satellites
[S-HRG-98-1070] N85-26855
Soviet space programs, 1976-1980 (with supplementary data through 1983). Part 3: Unmanned space activities
[S-PRT-98-235-PT-3] N85-27765
National Telecommunications and Information Administration authorization
[GPO-38-660] N85-27766
East-West cooperation in outer space
[S-HRG-98-1064] N85-27767
Department of Housing and Urban Development-independent agencies appropriations for 1986. Part 6: National Aeronautics and Space Administration
[GPO-47-235] N85-27768

CONICAL FLOW
Conical stagnation points in the flow around an external corner — delta wings
[VTH-LR-396] N85-26680

CONIFERS
Microwave model prediction and verifications for vegetated terrain
[E85-10102] N85-27322

CONSERVATION EQUATIONS
Progress of computational fluid dynamics in the world N85-26612
CONSERVATION LAWS
An approximation theory for nonlinear evolution equations and single conservation laws N85-26614
CONSTRAINTS
Orbiter middeck/payload standard interfaces control document
[NASA-TM-87473] N85-26840
CONTACT RESISTANCE
Oil resistant silicone elastomers
[AD-131523] N85-26987
CONTACTORS
Free-surface phenomena under low- and zero-gravity conditions
[NASA-CR-175835] N85-27168
CONTAMINANTS
Density of impurity states associated to inversion layers
[INPE-3406-PRE/675] N85-27702
CONTINENTAL SHELVES
MARMAP survey of the continental shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia (1977 - 1983). Atlas 1: Summary of operations
[PB85-150985] N85-27506
CONTOURS
Acceleration sensitivity reduction method
[AD-D011631] N85-27146
Contour line generalization using digital image processing methods N85-27357
A fast hidden line algorithm with contour option
[NASA-CR-175803] N85-27582
Application of hierarchical data structures to geographical information systems
[AD-A152169] N85-27753
CONTRACT MANAGEMENT
Automation of the reporting and tracking requirements of architect-engineering type contracts
[AD-A152218] N85-27745
CONTROL BOARDS
Information presentation in power plant control rooms
[VTT-320] N85-27668
CONTROL MOMENT GYROSCOPES
A Gimbal sizing analysis for an IPACS rotating assembly
[NASA-CR-172524] N85-26913
CONTROL STABILITY
Static longitudinal stability and control characteristics of the Fokker F27 Friendship calculated by simple handbook methods
[VTH-LR-394] N85-26728
CONTROL SURFACES
Flight control system reconfiguration design using quantitative feedback theory
[AD-A151771] N85-26722
The aerodynamics of controls N85-26748
CONTROL SYSTEMS DESIGN
Cost Effective and Affordable Guidance and Control Systems
[AGARD-CP-360] N85-26638
Some aspects of how to design cost-effective flight control systems N85-26639
Design adequacy: An effectiveness factor N85-26642
A modern control design methodology with application to the CH-47 helicopter
[AD-A151946] N85-26723
Application of linear optimal control theory to the design of the elevator control system of the DHC-2 Beaver experimental aircraft
[VTH-LR-411] N85-26729
The flight control system for the Experimental Aircraft Programme (EAP) demonstrator aircraft N85-26755
The STOL and maneuver technology program integrated control system N85-26757
Corrective-predictive systems
[BLL-M-36063-(5828.4)] N85-27573
Some aspects of how to design cost-effective flight control systems
[MBB-LKE-32/S/PUB/143] N85-27729
CONTROL THEORY
AN investigation into the control limitations of a bank to turn missile in the terminal homing phase
[AD-A152193] N85-26696
Flight control system reconfiguration design using quantitative feedback theory
[AD-A151771] N85-26722
Application of linear optimal control theory to the design of the elevator control system of the DHC-2 Beaver experimental aircraft
[VTH-LR-411] N85-26729
Technical evaluation report on the Flight Mechanics Symposium on Active Control Systems: Review, Evaluation and Projections
[AGARD-AR-220] N85-26730
ACT applied to helicopter flight control N85-26738
The flight control system for the Experimental Aircraft Programme (EAP) demonstrator aircraft N85-26755
The investigation of tethered satellite system dynamics
[NASA-CR-175855] N85-26854
Optimal open loop and nonlinear feedback control for remote orbital capture
[AD-A151967] N85-26859
Control of motion of manipulator robots on basis of first-order kinematic algorithms N85-27047
CONTROLLERS
Model reduction techniques applied to the control of large space structures
[AD-A151784] N85-26857
Further development of an Interactive Control Engineering Computer Analysis Package (ICECAP) for discrete and continuous systems
[AD-A151783] N85-27546
CONVECTION
Optimum convection conditions for Czochralski growth of semiconductors
[INPE-3395-PRE/665] N85-27703
CONVECTION CLOUDS
Assessment of VAS soundings in the analysis of a preconvective environment
[NASA-TM-86205] N85-27427
CONVECTION CURRENTS
Assessment of VAS soundings in the analysis of a preconvective environment
[NASA-TM-86205] N85-27427
CONVERGENCE
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172
Analysis of the convergence of mixed finite element methods
[HTKK-MAT-A227] N85-27613
CONVEXITY
An experimental investigation of the interaction between a shock wave and a turbulent boundary layer on a convex wall
[VTH-LR-428] N85-27187
The essence of invexity
[CSIR-TWISK-321] N85-27626
COOLING
Mechanism of formation of low temperatures in nighttime Venusian thermosphere N85-26807
The use of heat pumps in district heat supply
[BLL-OA-TRANS-2728-(6196.3)] N85-27163
COORDINATES
Analysis of elastoplastic grids under conditions of variable loads
[REPT-16/1984] N85-27242
COPPER
Measurement of elements in the stratosphere
[NASA-CR-175891] N85-27414
COPPER CHLORIDES
Environmental stability of intercalated graphite fibers
[NASA-TM-87025] N85-26992
CORN
Modeling the backscattering and transmission properties of vegetation canopies
[E85-10099] N85-27320
CORNER FLOW
Conical stagnation points in the flow around an external corner — delta wings
[VTH-LR-396] N85-26680
CORNERS
Free-surface phenomena under low- and zero-gravity conditions
[NASA-CR-175835] N85-27168
CORONAL LOOPS
Very large array observations of coronal loops and related observations of solar type stars
[AD-A152027] N85-27817
CORRELATION
Elevated temperature biaxial fatigue
[NASA-CR-175795] N85-27263
CORRELATION DETECTION
On the 1983 drought in northeast Brazil
[INPE-3412-PRE/678] N85-27476
CORROSION
Sodium and lithium corrosion in molybedenum heat pipes
[DE85-005561] N85-27179
NBS (National Bureau of Standards) research reports
[PB85-127421] N85-27764
CORROSION PREVENTION
Protective coatings for aircraft structures: A review
[VTH-LR-413] N85-26704
Material for protection of metal surfaces against corrosion by molten salts
[DE85-007714] N85-26968
CORROSION RESISTANCE
Powder metallurgy bearings for advanced rocket engines N85-26881
Evaluation of the corrosion properties of aluminum alloy 5083 weldments
[DE85-007729] N85-26977
Investigation of the pitting potential of rapidly solidified aluminum-lithium alloys
[VTH-LR-434] N85-26986
Investigation of the influence of some paint systems and water displacing corrosion inhibitors on anodic undermining corrosion of aluminum 2024 clad alloy — aircraft structures
[VTH-LR-443] N85-27009
Material for electrodes of pulsed and arc sources of light
[DE85-007453] N85-27156
CORROSION TESTS
Influence of pretreatment, environment and strain rate on stress corrosion cracking of the aluminum alloy 7075-T6
[VTH-LR-433] N85-26985
CORRUGATED SHELLS
Stressed state of multilayer thick-walled longitudinally corrugated cylinders N85-27069
COSMIC RAYS
Measurements of fluxes of high-energy protons and electrons by 2 oppositely oriented spectrometers aboard Cosmos-368 artificial Earth satellite N85-26800
The fast individualists in the solar system: Cosmic rays N85-27806
Results from the Helios galactic and solar cosmic ray experiment (E7) N85-27807
COSMOLOGY
Dark matter, galaxies, and large scale structure in the universe
[DE85-008053] N85-27786
Inflation from extra dimensions
[DE85-007834] N85-27787
COSMONAUTS
Cosmonaut Savitskaya says many women in cosmonaut training N85-26774
COST ANALYSIS
Combinatorial performance/cost analysis of an autonomous navigation system for aircraft N85-26640
Design-To-Cost (DTC) methodology to achieve affordable avionics N85-26645
Cost prediction model for various payloads and instruments for the Space Shuttle Orbiter
[NASA-CR-175781] N85-26842
Model reduction techniques applied to the control of large space structures
[AD-A151784] N85-26857
Manufacturing cost analysis of a parabolic dish concentrator (General Electric design) for solar thermal electric power systems in selected production volumes
[NASA-CR-175772] N85-27380
COST EFFECTIVENESS
Cost Effective and Affordable Guidance and Control Systems
[AGARD-CP-360] N85-26638
The series 2000: A miniature gas bearing DTG for low cost strapdown guidance and control N85-26648
A cost-efficient control procedure for the benefit of all airspace users N85-26651
Simulation: A tool for cost-effective systems design and live test reduction N85-26657
New stage in robotics development N85-27045
Paton Institute expert on GDR-USSR welding research N85-27078
Parametric study of potential early commercial power plants Task 3-A MHD cost analysis
[NASA-CR-175839] N85-27377
Trends shaping advanced aircrew training capabilities through the 1990s
[AD-A152277] N85-27530
Some aspects of how to design cost-effective flight control systems
[MBB-LKE-32/S/PUB/143] N85-27729
COST ESTIMATES
Cost prediction model for various payloads and instruments for the Space Shuttle Orbiter
[NASA-CR-175781] N85-26842
Manufacturing cost analysis of a parabolic dish concentrator (General Electric design) for solar thermal electric power systems in selected production volumes
[NASA-CR-175772] N85-27380
COST REDUCTION
Reusable software: A concept for cost reduction N85-26655
COSTS
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe
[NASA-CR-174840] N85-27012

COUPLING
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5) [AD-A152281] N85-26967
Study of the coupling between average, coherent and turbulent fields in a circular excited free jet [ISL-R-115/83] N85-27184
An analytical investigation of dynamic coupling in nonlinear, geared rotor systems N85-27218
COVARIANCE
Optimal relative data weights N85-27296
COWLINGS
Low-speed aerodynamic test of an axisymmetric supersonic inlet with variable cowl slot [NASA-TM-87039] N85-26710
CRAB NEBULA
Optical pulsar in the Large Magellanic Cloud remnant 0540-69.3 [DE85-006707] N85-27788
CRACK INITIATION
Fatigue damage and small crack growth during biaxial loading N85-27247
The practical and theoretical significance of small cracks: An evaluation [VTH-LR-432] N85-27283
CRACK PROPAGATION
A review of fracture mechanics life technology N85-26863
Hydrogen induced crack growth in Grade-12 Titanium [BNL-NUREG-35596] N85-26976
Initial quality of advanced joining concepts [AD-A152241] N85-27027
Automatic tracking of crack growth via finite elements N85-27246
Predicting fully plastic mode 2 crack growth from an asymmetric defect [AD-A152227] N85-27269
On the use of marker loads for fatigue crack growth measurements [FFA-TN-1984-52] N85-27277
The practical and theoretical significance of small cracks: An evaluation [VTH-LR-432] N85-27283
CRACKING (CHEMICAL ENGINEERING)
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe [NASA-CR-174840] N85-27012
CRACKING (FRACTURING)
Echo-response from crack-like two-dimensional reflectors in focused ultrasonic fields. Ultrasonic crack tip method for the determination of crack depth [BLL-BISI-22062-(9022.06)] N85-27236
Initiation, growth and coalescence of small fatigue cracks [AD-A151799] N85-27265
CRACKS
Fatigue life extension N85-26864
The practical and theoretical significance of small cracks: An evaluation [VTH-LR-432] N85-27283
CREEP ANALYSIS
Low dose irradiation creep of pure nickel [DE85-006320] N85-26975
CREEP PROPERTIES
Method of investigating accumulations of damage to weld joints in the case of low-cycle creep [BLL-CE-TRANS-8088-(9022.09)] N85-27219
CREEP TESTS
Creep-fatigue interaction of notched 304 stainless steel bars N85-27249
CRITERIA
Selection of promising sites for magma energy experiments [DE85-006832] N85-27393
CRITICAL FLOW
Flow-induced vibration of the SSME LOX posts: Additional issues [DE85-007339] N85-26916
CRITICAL POINT
Special features of the temperature dependence of the capillary constant in the vicinity of the critical point [BLL-T6436/BG/LRS/LRST750/85] N85-27632
CROP GROWTH
Research on zero-gravity botany apparatus N85-26811
Evaluation of the area and severity of last night's frosts [REPT-109] N85-27473
CROSS CORRELATION
Scene analysis using recursive frequency domain correlation with energy normalization [AD-A151777] N85-27596
CROSS FLOW
Design and construction of a computer controlled mirothermocouple probe for the study of buoyant jets [AD-A152224] N85-27199
CRUDE OIL
Analysis of mesofissuring on space photographs: New technique for study of petroleum and gas deposits N85-26828
CRUISE MISSILES
AN investigation into the control limitations of a bank to turn missile in the terminal homing phase [AD-A152193] N85-26896
CRUSTAL FRACTURES
Basic research for the geodynamics program [NASA-CR-175751] N85-27424
CRYOGENICS
Bearings working group N85-26878
Advanced rocket engine cryogenic turbopump bearing thermal model N85-26879
Hybrid bearings for LH2 and LO2 turbopumps N85-26880
Rolling contact fatigue life of chromium ion plated 440C bearing steel N85-26882
CRYOSTATS
Cryostat and electronic development associated with multi-detector spectrometer systems [DE85-007624] N85-27203
CRYSTAL DEFECTS
Simulation of solidification in a Bridgman cell [NASA-CR-175838] N85-27705
TEM investigation of polar-on-nonpolar epitaxy: GaAs-AlGaAs on (100) Ge [DE85-007613] N85-27714
CRYSTAL GROWTH
Optimum convection conditions for Czochralski growth of semiconductors [INPE-3395-PRE/665] N85-27703
Simulation of solidification in a Bridgman cell [NASA-CR-175838] N85-27705
Dendritic growth from amorphous matrix [DE85-007630] N85-27712
CRYSTAL LATTICES
On the feasibility of Ab Initio calculations of ordering alloy phase diagrams [DE85-007073] N85-26979
Thermal annealing of Fe implanted Al2O3 in oxidizing and reducing environment: Revised version [DE85-007546] N85-26983
Atom location by electron channeling analysis [DE85-007549] N85-27716
CRYSTAL OPTICS
Lidar ER2 (ozone). Crystal characterization for harmonic conversion — laser systems [CERT-2/6129-00] N85-27717
CRYSTAL STRUCTURE
On the feasibility of Ab Initio calculations of ordering alloy phase diagrams [DE85-007073] N85-26979
Conducting a thermal conductivity survey [NASA-CR-175792] N85-27166
Simulation studies for surfaces and materials strength [NASA-CR-175766] N85-27262
CRYSTALLITES
Plastic deformation of crystalline polymers [AD-A152090] N85-26999
CRYSTALLIZATION
Plastic deformation of crystalline polymers [AD-A152090] N85-26999
Dendritic growth from amorphous matrix [DE85-007630] N85-27712
CRYSTALLOGRAPHY
Atom location by electron channeling analysis [DE85-007549] N85-27716
CRYSTALS
Method of fabricating acceleration resistant crystal resonators and acceleration resistant crystal resonators so formed [AD-D011630] N85-27145
CUMULATIVE DAMAGE
The cumulative effects of long term exposure to low levels of radiofrequency radiation (RFR) N85-27132
CUMULUS CLOUDS
Ice multiplication in summertime cumulus clouds in the BEWMEX area N85-27445
The use of radar in determining precipitation processes in the BEWMEX area N85-27455
Effects of cloud seeding on precipitation development in cumulus clouds N85-27456
CURING
Characterization-curing-property studies of HBRF 55A resin formulations [NASA-CR-175836] N85-26989
Formulation/cure technology for ultrahigh molecular weight silphenylene-siloxane polymers [NASA-TP-2476] N85-26990
Evaluation of experimental epoxy monomers [NASA-TM-87476] N85-26996
CURRENT DENSITY
Investigation of pseudo bi-polar nickel cadmium batteries as filter elements for pulsed power loads [AD-A152112] N85-27389
CURVATURE
Temperature: Curvature relationships for unsymmetric graphite-epoxy laminates [VPI-E-85-08] N85-26926
Formulas for updating the generalized inverse of a symmetric matrix perturbed by a symmetric rank 2 matrix composed of 2 nonsymmetric DYADS [AD-A151736] N85-27629
CURVE FITTING
Determination of quantitative relationships between selected critical helicopter design parameters [AD-A152034] N85-26700
Locally-weighted-regression scatter-plot smoothing (LOWESS): A graphical exploratory data analysis technique [AD-A152239] N85-27609
CUTTING
Device for preventing intrusion of a blade during vibration cutting of intermittent cutting with a lathe N85-27232
CYCLIC LOADS
A review of fracture mechanics life technology N85-26863
Analysis of elastoplastic grids under conditions of variable loads [REPT-16/1984] N85-27242
On the use of marker loads for fatigue crack growth measurements [FFA-TN-1984-52] N85-27277
CYCLOGENESIS
A survey of major east coast snowstorms, 1960-1983. Part 2. Summary of surface and upperlevel characteristics [NASA-TM-86195] N85-27471
A survey of major east coast snowstorms, 1960-1983. Part 2: Case studies of eighteen storms [NASA-TM-86196] N85-27472
CYCLONES
Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones [PB85-164994] N85-27499
CYLINDRICAL BODIES
Measurements of the symmetric aerodynamic coefficients for flat faced cylinders in the angle of attack regime 0 to 90 deg for transonic and supersonic speeds [FFA-TN-1984-04] N85-26675
CYLINDRICAL SHELLS
Parametric study of autooscillation upon flow of supersonic jet into cylindrical cavity N85-27060
Stability of anisotropic cylindrical sandwich shells N85-27065
Study of oscillations of composite cylindrical shells using a dynamic stiffness technique N85-27066
Stressed state of multilayer thick-walled longitudinally corrugated cylinders N85-27069
An analysis for axially compressed orthotropic shells with a multimode imperfection repreeentation [VTH-LR-422] N85-27281

D

DAMAGE
Thermal annealing of Fe implanted Al2O3 in oxidizing and reducing environment: Revised version [DE85-007546] N85-26983
Damage caused to polyurethane foams by aging, simulated sunlight exposure, heat and fire [AD-A152040] N85-26998
Method of investigating accumulations of damage to weld joints in the case of low-cycle creep [BLL-CE-TRANS-8088-(9022.09)] N85-27219
Impact of ozone on vegetation [PB85-159937] N85-27403
DAMPING
Model reduction techniques applied to the control of large space structures [AD-A151784] N85-26857
Turbine blade friction damping study N85-26886
Measurement of damping of graphite epoxy materials [NASA-CR-175793] N85-26925
Non-contact hydrostatic bearings N85-27048
DATA ACQUISITION
The Telecommunications and Data Acquisition Report [NASA-CR-175842] N85-27094
Infrared preservation photography N85-27189
Design and construction of a computer controlled mirothermocouple probe for the study of buoyant jets [AD-A152224] N85-27199
CNPq/INPE LANDSAT system: Report of activities from October 1, 1983 to September 30, 1984 — Brazil [E85-10097] N85-27318

Present stage of utilization of the ARGOS system by the ORSTOM hydrological service for hydrometric data collection N85-27348
Use of a network of telemetered meteorological stations for prediction of the distribution of an atmospheric tracer N85-27458
A climatic data bank for Northern Hemisphere land areas, 1851-1980
[DE85-007863] N85-27486

DATA BASE MANAGEMENT SYSTEMS
Maintaining consistency and accommodating network repair in a self-regenerative distributed database management system (a discussion of the means and cost) N85-26656
Flow dynamic environment data base development for the SSME N85-26885
Network information management subsystem N85-27106
Implementation and analysis of a microcomputer based relational database system
[AD-A151770] N85-27536
An adaptive technique and its application in database design N85-27748
Internal and external performance measurement methodologies for database systems
[AD-A152025] N85-27751
Data dictionary design as a stepping-stone to DBMS (Data Base Management System) implementation in the Indonesian Army Data Collecting and Processing Service
[AD-A152101] N85-27752
Application of hierarchical data structures to geographical information systems
[AD-A152169] N85-27753
DoD manual for standard data elements, part 1
[AD-A152201] N85-27754
Scientific data bases on a VAX-11/780 running VMS
[DE85-007925] N85-27760
Data management issues of statistical databases
[DE85-007616] N85-27763

DATA BASES
Flow dynamic environment data base development for the SSME N85-26885
An analysis of data dictionaries and their role in information resource management
[AD-A152134] N85-27121
Status of the observational data sets --- TOPEX N85-27286
Acid precipitation in North America: 1980, 1981 and 1982 annual data summaries from acid deposition system data base
[PB85-162477] N85-27410
Implementation and analysis of a microcomputer based relational database system
[AD-A151770] N85-27536
Diagnosis: Using automatic test equipment and an artificial intelligence expert system
[AD-A151918] N85-27576
Software for reflectivity calculations of X-ray mirrors, revision 1
[DE85-006642] N85-27688
Retrieval performance in a full text journal article database N85-27747
Access path optimization for network database retrieval N85-27749
Design of an interface to an information retrieval network N85-27750
Internal and external performance measurement methodologies for database systems
[AD-A152025] N85-27751
Data management issues of statistical databases
[DE85-007616] N85-27763

DATA COLLECTION PLATFORMS
Data Collection and Platform Location by Satellite: ARGOS Users' Conference N85-27333
DB2 and DB3: The next generation --- buoys N85-27337
A seismic ARGOS data collection platform N85-27350
An operational buoy network collecting meteorological data N85-27351
Operational experiences with the ARGOS system in Greenland N85-27353

DATA LINKS
Consultative Committee for Space Data Systems. Panel 1: Support
[NASA-CR-175786] N85-27090
Continued development and implementation of the Universal Network Interface Device (UNID) 2 in the Digital Engineering Laboratory Network (DELNET), volume 2
[AD-A151947] N85-27570

DATA MANAGEMENT
Implementation and analysis of a microcomputer based relational database system
[AD-A151770] N85-27536
Data dictionary design as a stepping-stone to DBMS (Data Base Management System) implementation in the Indonesian Army Data Collecting and Processing Service
[AD-A152101] N85-27752

DATA PROCESSING
Consultative Committee for Space Data Systems. Panel 1: Support
[NASA-CR-175786] N85-27090
Gravity model development software status N85-27289
The relevance of remote sensing to Brazil
[INPE-3421-PRE/686] N85-27332
Comparison of circulation statistics based on FGGE (First GARP Global Experiment) level 3-B analyses produced by GFDL (Geophysics Fluid Dynamics Laboratory) and ECMWF (European Centre for Medium Range Weather Forecasts) for special observing periods
[PB85-153948] N85-27492
Algorithms for determining the relative complexity of dynamic signals
[BLL-M-36111-(5828.4)] N85-27574
Management considerations for an information center
[AD-A151774] N85-27742
DoD manual for standard data elements, part 1
[AD-A152201] N85-27754
A Dictionary-Directory System (DDS) for the SPLICE system
[AD-A152223] N85-27759

DATA PROCESSING EQUIPMENT
A procedure for communications with PDP-10 and PDP-11 (IS/1 UNIX) type computers through use of CPT word processing equipment, revision 1
[DE85-007596] N85-27540

DATA REDUCTION
Status of the observational data sets --- TOPEX N85-27286
Shuttle imaging radar-A (SIR-A) data analysis --- geology of the Ozark Plateau of southern Missouri, land use in western Illinois, and vegetation types at Koonamore Station, Australia
[NASA-CR-175785] N85-27324

DATA SMOOTHING
Locally-weighted-regression scatter-plot smoothing (LOWESS): A graphical exploratory data analysis technique
[AD-A152239] N85-27609

DATA STORAGE
Use of a network of telemetered meteorological stations for prediction of the distribution of an atmospheric tracer N85-27458
A climatic data bank for Northern Hemisphere land areas, 1851-1980
[DE85-007863] N85-27486

DATA SYSTEMS
Determining availability characteristics of DSN data systems using discrepancy report data N85-27109

DATA TRANSMISSION
A method of estimating aircraft attitude from fly by wire flight control system data N85-26653
The Record of Electrical and Communication Engineering Conversazione, volume 53, no. 2, November 1984
[ISSN-0385-7719] N85-27022
Historical perspectives on information transmission engineering N85-27023
Optical non-line-of-sight covert, secure high data communication system
[AD-D011607] N85-27087
Meteorological factors in Earth-Satellite propagation
[NASA-CR-175764] N85-27089
Evaluation of Ada (trademark) as a communications programming language, volume 1
[AD-A152314] N85-27559
Evaluation of Ada (trademark) as a communications programming language. Volume 2: Communications protocols application
[AD-A152315] N85-27560

DECELERATION
Improving inflight negative Gz restraint for aircrewmen
[AD-A151909] N85-26688

DECIDUOUS TREES
Microwave model prediction and verifications for vegetated terrain
[E85-10102] N85-27322

DECISION MAKING
Design adequacy: An effectiveness factor N85-26642
Method of selecting robotized system design for pressing process N85-27040
Diagnostic system
[INPE-3350-PRE/659] N85-27519
Research in knowledge representation for natural language understanding
[AD-A152260] N85-27579
Personal computer aided decision analysis
[AD-A151911] N85-27743

DECODERS
A software simulation study of a sequential decoder using the Fano algorithm N85-27100

DECODING
Symbol stream combining in a convolutionally coded system N85-27101

DECOMPOSITION
Photovoltaic cell reliability research: Investigation of accelerated stress factors and failure-degradation mechanisms in terrestrial solar cells
[NASA-CR-175815] N85-27388
A decomposition procedure for convex quadratic programs
[AD-A151732] N85-27595

DECONTAMINATION
Development of a Persistent Chemical Agent Simulator System (PCASS)
[NASA-CR-175776] N85-26938

DECOUPLING
A modern control design methodology with application to the CH-47 helicopter
[AD-A151946] N85-26723
On the choice of coordinates for semiconductor simulation
[AD-A152214] N85-27708

DEEP SPACE NETWORK
Consultative Committee for Space Data Systems. Panel 1: Support
[NASA-CR-175786] N85-27090
The Telecommunications and Data Acquisition Report
[NASA-CR-175842] N85-27094
Maintenance of time and frequency in the DSN using the global positioning system N85-27105
Network information management subsystem N85-27106
Determining availability characteristics of DSN data systems using discrepancy report data N85-27109

DEFECTS
Echo-response from crack-like two-dimensional reflectors in focused ultrasonic fields. Ultrasonic crack tip method for the determination of crack depth
[BLL-BISI-22062-(9022.06)] N85-27236
Predicting fully plastic mode 2 crack growth from an asymmetric defect
[AD-A152227] N85-27269
An analysis for axially compressed orthotropic shells with a multimode imperfection representation
[VTH-LR-422] N85-27281
The statistical analysis of initial imperfection measurements --- shell profiles
[VTH-LR-442] N85-27622

DEFLAGRATION
Analysis of deflagration to detonation transition in high-energy solid propellants N85-27010

DEFLECTION
A feasibility study for using low boiling point fluids to change aircraft tire deflection
[AD-A152096] N85-26701
Analysis of elastoplastic grids under conditions of variable loads
[REPT-16/1984] N85-27242
Quasi-steady vibrations of a rotating shaft grazing an obstacle: Spiral vibration
[BLL-CE-TRANS-7962-(9022.09)] N85-27256

DEFORMATION
Estimation of the depth of a spherical cap in an hydraulic drawing test for some simple conditions of loss of stability
[REPT-4/1984] N85-26956
Tooth wear in worm gears in vacuum N85-27070
Optimal modeling with a minimum of local distortion
[REPT-18/1984] N85-27243
Finite axisymmetric deformation of a thin shell of revolution N85-27251
Principles of wave formation along web of H-beams
[BLL-M-36041-(5828.4)] N85-27253
Full statistical characteristics of microdeformation
[BLL-M-36076-(5828.4)] N85-27254
Nonlinear equations for dynamics of pretwisted beams undergoing small strains and large rotations
[NASA-TP-2470] N85-27258

DEGENERATION
On some physical impurity properties of doped-indirect gap semiconductors at low and intermediate concentrations
[INPE-3452-PRE/704] N85-27701

DEGREES OF FREEDOM
Dispersion sensitivity of the eight inch advanced ramjet munitions technology projectile due to wind and minor thrust errors
[AD-A152145] N85-26835
Boson degrees of freedom in Fermion many-body systems
[DE85-006997] N85-27660

DEHYDRATION
Effects of dehydration or cold exposure and restricted fluid intake upon cognitive performance
[AD-A151973] N85-27525

DELTA WINGS
Conical stagnation points in the flow around an external corner — delta wings
[VTH-LR-396] N85-26680

DEMAGNETIZATION
Magnetic method of inspecting mechanical properties of general purpose tubes
[BLL-M-36084-(5828.4)] N85-27235

DEMAND (ECONOMICS)
Satellite provided customer promises services, a forecast of potential domestic demand through the year 2000. Volume 4: Sensitivity analysis
[NASA-CR-174662] N85-27092

DEMOGRAPHY
Experience of the Institute of Space Research with the use of remote sensing in urban planning studies
[INPE-3159-PRE/533] N85-27770

DENDRITIC CRYSTALS
Dendritic growth from amorphous matrix
[DE85-007830] N85-27712

DENSITY (MASS/VOLUME)
Characterization-curing-property studies of HBRF 55A resin formulations
[NASA-CR-175836] N85-26989

DENSITY DISTRIBUTION
Measurements in low pressure flow using an electronic beam detector — wind tunnel tests N85-26676
Altimetry data and the elastic stress tensor of subduction zones
[NASA-CR-175796] N85-27425

DENSITY MEASUREMENT
Determination of permissible heating rate of metal
[BLL-M-36107-(5828.4)] N85-26957

DEPOSITION
LPCVD tungsten deposition on Si-Ge alloy
[DE85-005588] N85-26970
Emission inventory applications to regional acid deposition modeling
[PB85-157386] N85-27033
Energy deposition from particle beams
[DE85-007382] N85-27654

DEPTH
Estimation of the depth of a spherical cap in an hydraulic drawing test for some simple conditions of loss of stability
[REPT-4/1984] N85-26956

DESCENT
Planning fuel-conservative descents in an airline environmental using a small programmable calculator: Algorithm development and flight test results
[NASA-TP-2393] N85-26705

DESCRIPTIONS
Glossary of landscape and vegetation ecology for Alaska
[PB85-153831] N85-27372
DoD manual for standard data elements, part 2
[AD-A152202] N85-27755
DoD manual for standard data elements, part 3
[AD-A152203] N85-27756

DESERTS
Utilization of remote sensing data in the evaluation of air pollution characteristics in the south coast/Southeast Desert Air Basin
[PB85-162063] N85-27407

DESIGN ANALYSIS
Metal armatures for railguns
[AD-A152129] N85-26838
Fuel and oxidizer turbine loss analysis N85-26900
Cryostat and electronic development associated with multi-detector spectrometer systems
[DE85-007624] N85-27203
Numerical optimization algorithm for engineering problems using microcomputer
[AD-A152135] N85-27554

DESIGN TO COST
Design-To-Cost (DTC) methodology to achieve affordable avionics N85-26645
The series 2000: A miniature gas bearing DTG for low cost strapdown guidance and control N85-26648
Reusable software: A concept for cost reduction N85-26655

DESORPTION
Quantum statistical theory of vibrational dynamics in a laser-driven admolecule-surface system
[AD-A152022] N85-27719

DESTRUCTIVE TESTS
An improved torsional method for determining the fracture toughness of stiff materials and of adhesive joints
[AD-A152091] N85-27267

DETECTION
Ion sensor signal fluctuations during operation of spacecraft reaction engines N85-26815
New focal plane detector system for the broad range spectrometer
[DE85-005370] N85-27201
A mathematical model for calculating detection probability of a diffusion target
[AD-A152026] N85-27601

DETONATION
Analysis of deflagration to detonation transition in high-energy solid propellants N85-27010
Model for computing late detonations initiated in propellants by impact (XDT reactions)
[DE85-007377] N85-27019
Generation of detonation waves of given spatial and temporal characteristics
[ISL-R-103/83] N85-27021

DETONATORS
Surveillance program for the dissection and analysis of explosive and pyrotechnic components
[DE85-006105] N85-27016

DEUTERIUM
Monodeurated methane in the outer solar system. 2. Its detection on Uranus at 1.6 microns
[NASA-CR-175762] N85-27782

DEUTERIUM COMPOUNDS
Monodeurated methane in the outer solar system. 2. Its detection on Uranus at 1.6 microns
[NASA-CR-175762] N85-27782

DEUTERIUM FLUORIDES
Rotational energy transfer in highly vibrationally excited hydrogen fluoride and deuterium fluoride
[AD-A152003] N85-27650

DEW POINT
Precipitable water in the atmosphere, determined from surface dewpoint values N85-27457
AWS (Air Weather Service) climatic briefs: Asia
[AD-A151944] N85-27481

DHC 2 AIRCRAFT
Application of linear optimal control theory to the design of the elevator control system of the DHC-2 Beaver experimental aircraft
[VTH-LR-411] N85-26729

DIAGNOSIS
Diagnostic system
[INPE-3350-PRE/659] N85-27519

DIAPHRAGM (ANATOMY)
Effects of posture and water immersion on diaphragmatic function N85-27515

DIATOMIC MOLECULES
Equation of state and two-body correlations for fluids of non-spherical molecules
[AD-A151909] N85-27174
Computer modeling of vibrational energy levels of potential laser candidates (diatomic molecules)
[AD-A151765] N85-27209

DICTIONARIES
An analysis of data dictionaries and their role in information resource management
[AD-A152134] N85-27121

DIELECTRIC PROPERTIES
In situ microwave measurements of dielectric properties and moisture in materials
[DE85-003622] N85-26953

DIELECTRICS
Trends in the electric field enhancement of dielectronic recombination cross sections
[DE85-006920] N85-27711

DIESEL ENGINES
Breakway friction and dynamic friction/wear measurements of various ceramic materials from 25 C (75 F) to 650 C (1200 F)
[NASA-CR-174803] N85-26994
Effect of traffic and meteorology on air pollution N85-27452

DIFFERENCES
Basic research for the geodynamics program
[NASA-CR-175751] N85-27424
On the relation between upwind-differencing schemes of Godunov, Engquist-Osher and Roe
[NASA-CR-175805] N85-27583

DIFFERENTIAL EQUATIONS
Finite axisymmetric deformation of a thin shell of revolution N85-27251
Use of REDUCE 2 for symbolic programming
[INPE-3355-PRE/633] N85-27544
Explicit construction of contractivity matrices
[TRITA-NA-8309] N85-27586
Evaluation of an algorithm for the solution of the time-dependent Euler equations
[AD-A151993] N85-27600

DIFFRACTION
An X-ray study of residual stresses in narrow groove TIG weldments
[DE85-006485] N85-27274
The problem of atmospheric turbulence
[NASA-CR-175783] N85-27464

DIFFRACTION PATTERNS
The development and implementation of an optical communications laboratory
[AD-A151682] N85-27111

DIFFUSION
Ionic conduction and water diffusion in Li (BETA)-alumina
[DE85-007548] N85-27005
The seasonal cycle of atmospheric CO in the Southern Hemisphere N85-27447
Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters
[INPE-3492-PRE/729] N85-27504
A mathematical model for calculating detection probability of a diffusion target
[AD-A152026] N85-27601
Polycrystalline semiconductor heterojunction modelling (CdS/CuInSe(sub)2)
[DE85-002913] N85-27713

DIFFUSION COEFFICIENT
Diffusion coefficients for coastal water determined from aerial photographs
[INPE-3413-PRE/679] N85-27331

DIGITAL COMPUTERS
A concept for map updating using digital image processing methods N85-27364
Contour line generalization using digital image processing methods N85-27367

DIGITAL DATA
CNPq/INPE LANDSAT system: Report of activities from October 1, 1983 to September 30, 1984 — Brazil
[E85-10097] N85-27318
A concept for map updating using digital image processing methods N85-27364
Contour line generalization using digital image processing methods N85-27367
What does digital image processing perform in the production of orthophotomaps N85-27368

DIGITAL FILTERS
High-speed digital baseband mixer N85-27103
Digital filters for digital phase-locked loops N85-27104

DIGITAL INTEGRATORS
Digital filters for digital phase-locked loops N85-27104

DIGITAL SIMULATION
A numerical simulation of the NFAC (National Full-scale Aerodynamics Complex) open-return wind tunnel inlet flow
[NASA-TM-86724] N85-26672
Dispersion sensitivity of the eight inch advanced ramjet munitions technology projectile due to wind and minor thrust errors
[AD-A152145] N85-26835

DIGITAL SYSTEMS
Application of AFTI/F-16 task-tailored control modes in advanced multirole fighters N85-26735
X-29A digital flight control system design N85-26736
Some flight test results with redundant digital flight control systems N85-26739
An update on experience on the fly by wire Jaguar equipped with a full-time digital flight control system N85-26740
Operational and developmental experience with the F/A-18A digital flight control system N85-26742
Flight testing and development of the F/A-18A digital flight control system N85-26743
The certification of airborne complex digital systems N85-26754
Automatic flight control modes for the AFTI/F-111 mission adaptive wing aircraft N85-26756
High-speed digital baseband mixer N85-27103

DIGITAL TECHNIQUES
Scene analysis using recursive frequency domain correlation with energy normalization
[AD-A151777] N85-27596

DILUTION
Dual electrochemical system
[AD-D011616] N85-27376

DIODES
Generalization of the Child-Langmuir relation for 1-dimensional time-dependent diodes
[DE85-007386] N85-27152

DIRECT CURRENT
Pulsewidth modulated speed control of brushless dc motors
[AD-A151966] N85-27148

DIRECT POWER GENERATORS
Space power plants N85-26813

DIRECTION FINDING
Radiation and scattering of spiral antennas
[AD-A151929] N85-27116

DIRECTORIES
Current alternative energy research and development in Illinois
[PB85-163137] N85-27397
DISCONNECT DEVICES
Torso restraint system
[AD-D011609] N85-26684
DISCRETE FUNCTIONS
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172
Quadratic spaces over discrete Hodge algebras N85-27593
On the choice of coordinates for semiconductor simulation
[AD-A152214] N85-27708
DISPERSIONS
Ultrasonic dispersion of soils for routine particle size analysis: Recommended procedures
[DE85-005530] N85-27643
DISPLACEMENT
Empirical development of ground acceleration, velocity and displacement for accidental explosions at J5 or the proposed large altitude rocket cell at Arnold Engineering Development Center
[DE85-006324] N85-27020
The nonlinear analysis of thick composite plates using a cubic spline function N85-27252
DISPLAY DEVICES
A comparison of pictorial and speech warning messages in the modern cockpit
[AD-A151917] N85-26706
Spatial and temporal visual masking and visibility
[AD-A151968] N85-27524
Trends shaping advanced aircrew training capabilities through the 1990s
[AD-A152277] N85-27530
A heuristic solution to the spacing problem: Maximizing the minimum Euclidean distance among N points in a convex region
[AD-A152116] N85-27603
Nematic liquid crystals for car dashboards
[BMFT-FB-T-84-296] N85-27718
DISSOCIATION
Identification and properties of molecular systems of potential use in solar-pumped lasers
[NASA-CR-175804] N85-27207
DISSOLVING
Dissolution of solid solutions in absence of internal mass transfer
[BLL-M-36092-(5828.4)] N85-26959
DISTORTION
Optimal modeling with a minimum of local distortion
[REPT-18/1984] N85-27243
Distortion functions
[DE85-007511] N85-27655
DISTRIBUTION (PROPERTY)
Maintaining consistency and accommodating network repair in a self-regenerative distributed database management system (a discussion of the means and cost) N85-26656
Hydrogen vibrational population distributions and negative ion generation in tandem high-density hydrogen discharges
[DE85-006764] N85-27657
DIURNAL VARIATIONS
Spectral characteristics of protons at low and high altitudes during geomagnetic storm of 29 July 1977 N85-26786
DIVERTERS
Coupled plasma-neutral transport model for the scrape-off region
[DE85-007559] N85-27695
DIVING (UNDERWATER)
A comprehensive strategy for saturation decompression with nitrogen-oxygen
[AD-A151800] N85-27520
DOCUMENTS
Recent Naval Postgraduate School publications
[AD-A151723] N85-27740
DONOR MATERIALS
Electronic density of states for the double donor system SiP, As
[INPE-3447-PRE/700] N85-27700
DOPED CRYSTALS
Flat-plate solar array project process development area: Process research of non-CZ silicon material
[NASA-CR-175777] N85-27382
Heavy doping effects in high efficiency silicon solar cells
[NASA-CR-175779] N85-27383
On some physical impurity properties of doped-indirect gap semiconductors at low and intermediate concentrations
[INPE-3452-PRE/704] N85-27701
Effect of dislocations on gallium arsenide FETs
[AD-A152249] N85-27709
TEM investigation of polar-on-nonpolar epitaxy: GaAs-AlGaAs on (100) Ge
[DE85-007613] N85-27714
DOPES
Flat-plate solar array project process development area: Process research of non-CZ silicon material
[NASA-CR-175777] N85-27382
DOPPLER EFFECT
Simulation of a low orbit restitution. Covariance analysis of the position-velocity by Doppler and accelerometer measurements
[CNES-CT/DTI/MS/AE/166] N85-26836
DORIS: Prediction in Doppler measurement — satellite onboard measurement
[CNES-CT/DTI/MS/AE/170] N85-26843
LDA study of non-steady flame propagation in a constant volume duct
[DE85-007233] N85-26948
Thermospheric winds observed by OI6300A Doppler shifts at 23 deg S in the Brazilian sector
[INPE-3384-RPE/470] N85-27479
A comprehensive strategy for saturation decompression with nitrogen-oxygen
[AD-A151800] N85-27520
Positron annihilation studies of vacancy formation in tungsten, chromium, and niobium
[DE85-006837] N85-27710
DOPPLER RADAR
Comparison of wind velocity in thunderstorms determined from measurements by a ground-based Doppler radar and an F-106B airplane
[NASA-TM-86348] N85-26687
Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California
[NASA-CR-3901] N85-27463
Influence of coherent mesoscale structures on satellite-based Doppler lidar wind measurements
[NASA-CR-175853] N85-27467
DOSIMETERS
The physical interactions of radiofrequency radiation fields and biological systems N85-27129
Radio Frequency Radiation (RFR) measurements in operational settings N85-27138
DRAG CHUTES
Parachute extraction device for ultralight gliders
[CH-643499-A5] N85-26663
DRAG REDUCTION
Exploratory wind-tunnel investigation of a wingtip-mounted vortex turbine for vortex energy recovery
[NASA-TP-2468] N85-26667
Demonstration of relaxed stability on a commercial transport N85-26745
Realisation of relaxed static stability on a commercial transport N85-26746
DRIFT (INSTRUMENTATION)
An investigation of tropospheric ions N85-27412
An inexpensive radar-responding relocation device for drifting oceanographic instruments
[AD-A152170] N85-27505
DROUGHT
On the 1983 drought in northeast Brazil
[INPE-3412-PRE/678] N85-27476
An appraisal of the duration of the recent drought in northeast Brazil and a forecast for 1985
[INPE-3477-PRE/720] N85-27478
DUCT GEOMETRY
Analytical study of flow phenomena in SSME turnaround duct geometries N85-26902
DUCTED FANS
Numerical analyses in aerodynamic design of aero-engine fan N85-26618
DUCTILITY
Ductility equation for porous metals and its linearization
[BLL-M-36118-(5828.4)] N85-26958
On the accurate representation of large strain non-proportional plastic flow in ductile materials
[DE85-007106] N85-27273
DUCTS
Vortex shedding flowmeters for liquids at high flow velocities N85-26906
LDA study of non-steady flame propagation in a constant volume duct
[DE85-007233] N85-26948
DURABILITY
Durability of Aramid reinforced aluminum laminate (ARALL)
[VTH-LR-423] N85-26933
Documentation and solar cell modules
[NASA-CR-175769] N85-27384
DYE LASERS
A study of mode-locked argon ion-dye laser systems N85-27205
Study on a prismatic dye vat — laser systems
[CERT-2/6124-04-RO] N85-27217
DYES
Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters
[INPE-3492-PRE/729] N85-27504
DYNAMIC CHARACTERISTICS
Active control landing gear for ground loads alleviation N85-26749
Rotordynamics N85-26888
DYNAMIC CONTROL
Alternatives for jet engine control
[NASA-CR-175831] N85-26713
Alternatives for jet engine control
[NASA-CR-175832] N85-26714
Alternatives for jet engine control
[NASA-CR-175833] N85-26715
A perspective on superaugmented flight control advantages and problems N85-26733
The investigation of tethered satellite system dynamics
[NASA-CR-175855] N85-26854
DYNAMIC MODELS
Observations, theoretical ideas and modeling of turbulent flows: Past, present and future
[NASA-TM-86679] N85-27167
DYNAMIC RESPONSE
Ion sensor signal fluctuations during operation of spacecraft reaction engines N85-26815
Proposal of a method for evaluating accuracy of estimated impulse response of a system N85-27024
Dynamic response of fluid transmission lines
[AD-A151926] N85-27171
An analytical investigation of dynamic coupling in nonlinear, geared rotor systems N85-27218
Dynamic response of shells and plates subjected to variable magnitude traveling loads N85-27250
Hopkinson bar simulation using DYNA2D
[DE85-006766] N85-27275
DYNAMIC STABILITY
Effects of bearing deadbands on bearing loads and rotor stability N85-26889
DYNAMIC STRUCTURAL ANALYSIS
Impact of magnetic isolation on pointing system performance in the presence of structural flexibility
[NASA-CR-172481] N85-26861
Technical overview structural dynamics N85-26883
USSR report: Engineering and equipment
[JPRS-UEQ-84-006] N85-27035
Nonlinear equations for dynamics of pretwisted beams undergoing small strains and large rotations
[NASA-TP-2470] N85-27258
Wind energy technology program summary
[DE85-007349] N85-27392
On various Fourier series utilized for solution of structural mechanics problems
[VTH-LR-429] N85-27615
DYNAMOMETERS
Water brake convertor: A simple device to convert mechanical energy into heat energy
[DE85-006021] N85-26766

E

EARTH (PLANET)
Studies related to the deep Earth gas: 1983
[PB85-171114] N85-27373
General continuous formulations of atmospheric energy laws N85-27448
EARTH ATMOSPHERE
Modeling plasma mantle of Earth's magnetosphere N85-26790
The problem of atmospheric turbulence
[NASA-CR-175783] N85-27464
Intercomparison of Radiation Codes in Climate Models (ICRCCM)
[DE85-007251] N85-27487
EARTH CRUST
Study of spatial distribution of auroras N85-27315
Altimetry data and the elastic stress tensor of subduction zones
[NASA-CR-175796] N85-27425
EARTH MANTLE
Internal waves in layers of Earth's upper mantle N85-27312
EARTH MOVEMENTS
Inversion of Rayleigh wave group velocities from high-explosive tests
[AD-A152172] N85-27175
EARTH OBSERVATIONS (FROM SPACE)
Application of space methods in geodesy N85-26817
Tenth Conference of Working Group of Socialist Countries on Remote Sensing of Earth under Intercosmos Program N85-26820
Contribution to space program reviewed N85-26834

Status of the observational data sets — TOPEX N85-27286
Shuttle imaging radar-A (SIR-A) data analysis — geology of the Ozark Plateau of southern Missouri, land use in western Illinois, and vegetation types at Koonamore Station, Australia
[NASA-CR-175785] N85-27324
Modular Optoelectronic Multispectral Scanner (MOMS) for Earth observation. First results of STS-7 mission
[MBB-UR-717/83-O] N85-27732

EARTH ORBITS
Simultaneous Earth observations from 2 satellites
[NASA-TM-86204] N85-27325

EARTH PLANETARY STRUCTURE
Altimetry data and the elastic stress tensor of subduction zones
[NASA-CR-175796] N85-27425

EARTH RADIATION BUDGET EXPERIMENT
Year-to-year variability of components of Earth's radiation budget according to satellite measurement data N85-26821
Validation of the ERBE scanner scene identification methodology: Analysis with Nimbus-7 ERB data
[NASA-CR-172596] N85-27486

EARTH RESOURCES
Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms
[INPE-3359-PRE/637] N85-27545

EARTH ROTATION
Full shadow phenomenon in Earth's upper atmosphere N85-27316

EARTH TIDES
Ocean tide models for Topex analysis N85-27291

EARTH-VENUS TRAJECTORIES
Kovtunenko discuses Vega Project N85-26804

EARTHQUAKES
A seismic ARGOS data collection platform N85-27350
Response of a wind turbine blade to seismic and turbulent wind excitations N85-27375

ECHO SUPPRESSORS
Interference suppressor for radar MTI
[AD-D011606] N85-27086

ECONOMIC ANALYSIS
Technical and economic analysis of liquid fuel production from microalgae
[DE85-002926] N85-27018

ECONOMIC FACTORS
Ecology of Pamlico River, North Carolina: An estuarine profile
[PB85-155703] N85-27404

ECONOMICS
Prospects for developing attractive magnetic fusion concepts
[DE85-006925] N85-27684

ECOSYSTEMS
Ecology of Pamlico River, North Carolina: An estuarine profile
[PB85-155703] N85-27404
MARMAP survey of the continental shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia (1977 - 1983). Atlas 1: Summary of operations
[PB85-150985] N85-27506

EDDY CURRENTS
Preliminary results on passive eddy current damper technology for SSME turbomachinery N85-26890

EDUCATION
A review of safety practices and safety training for the explosives field
[AD-A152295] N85-27028
Automated CPX support system preliminary design phase
[NASA-CR-175784] N85-27091

EFFICIENCY
Optimal control of electric drive with simultaneous control inputs for motor current and flux N85-27049
High efficiency ionizer using a hollow cathode discharge plasma
[DE85-006690] N85-27693

EIGENVALUES
Squeezing the most out of Eigenvalue solvers on high-performance computers
[DE85-007569] N85-27565
Eigenvalue approximation methods for quantum lattice Hamiltonians N85-27627

EIGENVECTORS
Squeezing the most out of Eigenvalue solvers on high-performance computers
[DE85-007569] N85-27565

EL NINO
Forecast of Atlantic seasonal hurricane activity for 1985 N85-27470

ELASTIC BARS
Hopkinson bar simulation using DYNA2D
[DE85-006766] N85-27275

ELASTIC DEFORMATION
Identification and control of structures in space
[NASA-CR-175790] N85-26850
Simulation studies for surfaces and materials strength
[NASA-CR-175766] N85-27262

ELASTIC PROPERTIES
Mechanical properties of high performance carbon fibers N85-26922
The effects of pin elasticity, clearance, and friction on the stresses in a pin-loaded orthotropic plate
[NASA-CR-175816] N85-26927
Solution softening in molybdenum-rhenium alloys
[DE85-006706] N85-26972
On residual stress in an elastic body N85-27248

ELASTIC SCATTERING
Energy deposition from particle beams
[DE85-007382] N85-27654

ELASTOMERS
Oil resistant silicone elastomers
[AD-131523] N85-26987
Formulation/cure technology for ultrahigh molecular weight silphenylene-siloxane polymers
[NASA-TP-2476] N85-26990

ELASTOPLASTICITY
Influence of behavior laws in the explosive deformation of metal plates
[ISL-R-122/83] N85-27032
Consolidation theory with consideration of frame plasticity
[REPT-9/1984] N85-27240
Adaptation of continuous beams and the method of optimizing the flexibility of their elastic supports. Theorem on maximal adaptation loading, supplement
[REPT-10/1984-SUPPL] N85-27241
Analysis of elastoplastic grids under conditions of variable loads
[REPT-16/1984] N85-27242
Multinomial form of the solution of problems of the statistics of elastic rectangular disks
[REPT-17/1984] N85-27244

ELECTRIC AUTOMOBILES
AC powertrain for an electric vehicle, phase 2 and phase 3
[NASA-CR-175760] N85-27771

ELECTRIC BATTERIES
Photovoltaic powered vaccine refrigerator-freezer systems field test results
[NASA-TM-86972] N85-27386
INEL electric vehicle laboratory qualification: Transition test results and comparisons with JPL ETV1-2 data
[DE85-008006] N85-27772

ELECTRIC CONNECTORS
Characterization of solderless miniwrapping connections
[CNES-NT-112] N85-27238

ELECTRIC CONTACTS
LPCVD tungsten deposition on Si-Ge alloy
[DE85-005588] N85-26970

ELECTRIC CURRENT
Investigation of electron attachment and dissociation rates in C2F6/CH4 electric gas discharges
[AD-A151796] N85-27649

ELECTRIC DISCHARGES
Investigation of electron attachment and dissociation rates in C2F6/CH4 electric gas discharges
[AD-A151796] N85-27649

ELECTRIC ENERGY STORAGE
Cycling performance of the iron-chromium redox energy storage system
[NASA-TM-87034] N85-27387

ELECTRIC FIELD STRENGTH
Measuring electrical field fluctuations by Langmuir Double Probe Method N85-26789

ELECTRIC FIELDS
The physical interactions of radiofrequency radiation fields and biological systems N85-27129
Evaluation of human exposures to low frequency fields N85-27135
Theoretical and experimental comparisons of nearfield electrogalvanic fields due to nonlinear polarization layers
[AD-A152085] N85-27149
Equatorial F-region irregularity latitudinal extension and dynamo electric field
[INPE-3494-PRE/731] N85-27433
Trends in the electric field enhancement of dielectronic recombination cross sections
[DE85-006920] N85-27711

ELECTRIC MOTOR VEHICLES
INEL electric vehicle laboratory qualification: Transition test results and comparisons with JPL ETV1-2 data
[DE85-008006] N85-27772

ELECTRIC MOTORS
Electric motors with elastically mounted rotors N85-27048
Optimal control of electric drive with simultaneous control inputs for motor current and flux N85-27049
AC powertrain for an electric vehicle, phase 2 and phase 3
[NASA-CR-175760] N85-27771

ELECTRIC POTENTIAL
Sources of improvement in quality of contact butt welding of wire
[BLL-M-36085-(5828.4)] N85-27225
Investigation of pseudo bi-polar nickel cadmium batteries as filter elements for pulsed power loads
[AD-A152112] N85-27389

ELECTRIC POWER SUPPLIES
Maintenance of photovoltaic power systems
[AD-A152299] N85-27390

ELECTRIC PROPULSION
Analysis of orbit transfer vehicles for GPS Block 3 satellites
[AD-A152021] N85-26860

ELECTRIC WELDING
Sources of improvement in quality of contact butt welding of wire
[BLL-M-36085-(5828.4)] N85-27225

ELECTRICAL PROPERTIES
A transduction path method of solid state sensor analysis and investigation
[AD-A152123] N85-27707

ELECTRICAL RESISTANCE
A strain gauge manual
[AD-A151802] N85-27197

ELECTRICAL RESISTIVITY
Graphite fiber intercalation: Dynamics of the bromine intercalation process
[NASA-TM-87015] N85-26921
Electrical resistivity in amorphous metals: Consequences of phonon ineffectiveness in the diffraction model
[AD-A152130] N85-27150
Impurity bands associated with MOS inversion layers
[INPE-3483-PRE/726] N85-27704

ELECTRO-OPTICAL EFFECT
Modular Optoelectronic Multispectral Scanner (MOMS) for Earth observation. First results of STS-7 mission
[MBB-UR-717/83-O] N85-27732

ELECTRO-OPTICAL PHOTOGRAPHY
Investigations of the accuracy of the Digital Photogrammetry System (DPS), a rigorous three-dimensional compilation process for pushbroom imagery
[MBB-UA-753/83-O] N85-27734

ELECTRO-OPTICS
ACT applied to helicopter flight control N85-26738
INPE's line imaging camera: Preliminary results
[INPE-3476-PRE/719] N85-27194

ELECTROCHEMICAL CELLS
Cycling performance of the iron-chromium redox energy storage system
[NASA-TM-87034] N85-27387

ELECTROCHEMICAL CORROSION
Theoretical and experimental comparisons of nearfield electrogalvanic fields due to nonlinear polarization layers
[AD-A152085] N85-27149

ELECTROCHEMISTRY
Sixth DOE Electrochemical Contractor's Review. Extended abstracts
[DE84-013679] N85-27151
Dual electrochemical system
[AD-D011616] N85-27376

ELECTRODEPOSITION
Pulsed electrodeposition
[DE85-007057] N85-26950

ELECTRODES
Material for electrodes of pulsed and arc sources of light
[DE85-007453] N85-27156
Method of fabricating material for the electrodes of gas discharge devices
[DE85-007452] N85-27157
Investigation of pseudo bi-polar nickel cadmium batteries as filter elements for pulsed power loads
[AD-A152112] N85-27389

ELECTROENCEPHALOGRAPHY
A communications link for an implantable electrode array
[AD-A152238] N85-27510
The origin of brain potentials associated with selective visual attention
[AD-A152291] N85-27511

ELECTROLYTE METABOLISM
Evaluation of a field expedient technique for sweat sample collection
[AD-A151916] N85-27521

ELECTROMAGNETIC ABSORPTION
Study on a prismatic dye vat — laser systems
[CERT-2/6124-04-RO] N85-27217

ELECTROMAGNETIC ACCELERATION
High energy particle acceleration by coherent electromagnetic waves propagating across the magnetic field
[IPPJ-717] N85-27679
ELECTROMAGNETIC FIELDS
The Impact of Proposed Radio Frequency Radiation Standards on Military Operations
[AGARD-LS-136] N85-27128
Hazards of VLF electromagnetic fields N85-27136
ELECTROMAGNETIC INTERACTIONS
Velocity space diffusion of high energy ions induced by a lower hybrid wave in a nonuniform magnetic field
[IPPJ-714] N85-27681
ELECTROMAGNETIC INTERFERENCE
An update on experience on the fly by wire Jaguar equipped with a full-time digital flight control system N85-26740
ELECTROMAGNETIC MEASUREMENT
Lightning strikes on aircraft. The TRIP 82 experiment and 3-dimensional electromagnetic interferometry
[ONERA-RF-86/7154-PY] N85-26690
ELECTROMAGNETIC PULSES
Signal processing for the analysis of transient electromagnetic data
[DE85-007244] N85-27125
Optically triggered transferred-electron device microwave burst and single pulse generators
[AD-D011614] N85-27141
A synchrotron/inverse Compton interpretation of a solar burst producing fast pulses at lambda 3 mm and hard X-rays N85-27815
ELECTROMAGNETIC RADIATION
Characteristic functionals of stochastic wave processes
[REPT-14/1984] N85-27084
Multiple scattering of electromagnetic waves in discrete random media
[AD-A151766] N85-27112
Biological influences of low-frequency sinusoidal electromagnetic signals alone and superimposed on RF carrier waves
[PB85-161248] N85-27527
DARPA/TTO program IR binary optics
[AD-A152196] N85-27672
Study of the degradation of short-circuit current and the open-circuit tension of spatial solar cells as a function of the fluency of 1MeV electrons
[INPE-3356-PRE/634] N85-27814
Solar-Geophysical Data Number 484, December 1984. Part 1 (prompt reports): Data for November 1984, October 1984 and late data
[NASA-CR-175829] N85-27819
ELECTROMAGNETIC SCATTERING
Scattering center analysis for radar cross section modification N85-27085
Optical non-line-of-sight covert, secure high data communication system
[AD-D011607] N85-27087
ELECTRON ACCELERATION
Two-dimensional beat wave acceleration simulation
[DE85-005961] N85-27214
ELECTRON ATTACHMENT
Density of impurity states associated to inversion layers
[INPE-3406-PRE/675] N85-27702
ELECTRON BEAM WELDING
Institute's contribution to Soviet welding technology noted N85-27072
Paton Institute expert on GDR-USSR welding research N85-27078
Underwater pipeline: Welding by high frequency induction
[BLL-WI-TRANS-682-(9312.57)] N85-27221
ELECTRON BEAMS
Measurements in low pressure flow using an electronic beam detector — wind tunnel tests N85-26676
Investigation of electron attachment and dissociation rates in C2F6/CH4 electric gas discharges
[AD-A151796] N85-27649
High efficiency transverse dc electron beams
[AD-A152038] N85-27651
Energy deposition from particle beams
[DE85-007382] N85-27654
Survey of experimental and theoretical electron-impact ionization cross sections for transition metal ions in low stages of ionization
[DE85-007605] N85-27658
ELECTRON DENSITY (CONCENTRATION)
Structural inhomogeneities in amorphous nickel-phosphorus alloy
[BLL-M-36103-(5828.4)] N85-26960
ELECTRON ENERGY
Time-resolving electron temperature diagnostic for ALCATOR C
[DE85-004916] N85-27690
ELECTRON GUNS
High efficiency transverse dc electron beams
[AD-A152038] N85-27651
ELECTRON IMPACT
Theory of electron-impact atomic ionization cross sections
[AD-A151763] N85-27648
Survey of experimental and theoretical electron-impact ionization cross sections for transition metal ions in low stages of ionization
[DE85-007605] N85-27658
ELECTRON MICROSCOPY
Low dose irradiation creep of pure nickel
[DE85-006320] N85-26975
Tilt grain boundaries in NiO
[DE85-006839] N85-26978
ELECTRON PARAMAGNETIC RESONANCE
Ion and polymer chain motion in a superionic sodium-poly(ethylene oxide) complex
[AD-A152290] N85-27001
ELECTRON PLASMA
Charge uncovering effects on flute instabilities in hot electron plasmas
[DE85-006957] N85-27686
ELECTRON PRECIPITATION
X-ray intensification at balloon altitudes of the South Atlantic magnetic anomaly in association with geomagnetic activity
[INPE-3469-PRE/712] N85-27437
ELECTRON SCATTERING
Density of impurity states associated to inversion layers
[INPE-3406-PRE/675] N85-27702
ELECTRON SPECTROSCOPY
Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26926
ELECTRON TRANSFER
Optically triggered transferred-electron device microwave burst and single pulse generators
[AD-D011614] N85-27141
ELECTRON TRANSITIONS
The copper vapor laser N85-27417
ELECTRONIC COUNTERMEASURES
AN investigation into the control limitations of a bank to turn missile in the terminal homing phase
[AD-A152193] N85-26696
Digital RF delay line for ECM (electronic countermeasure) look-through
[AD-A152120] N85-27120
ELECTRONIC EQUIPMENT
Avionics integrity issues presented during NAECON (National Aerospace and Electronics Convention) 1984
[AD-A151923] N85-26707
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26965
ELECTRONIC MODULES
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 1: Program compilation
[AD-A152270] N85-26727
Maintenance of photovoltaic power systems
[AD-A152299] N85-27390
Modular Optoelectronic Multispectral Scanner (MOMS) for Earth observation. First results of STS-7 mission
[MBB-UR-717/83-O] N85-27732
ELECTRONIC SPECTRA
Theory of electron-impact atomic ionization cross sections
[AD-A151763] N85-27648
ELECTRONS
On the choice of coordinates for semiconductor simulation
[AD-A152214] N85-27708
Atom location by electron channeling analysis
[DE85-007549] N85-27716
ELECTROPHYSIOLOGY
The origin of brain potentials associated with selective visual attention
[AD-A152291] N85-27511
ELECTROSLAG WELDING
Institute's contribution to Soviet welding technology noted N85-27072
ELECTROSTATIC PROBES
Measuring electrical field fluctuations by Langmuir Double Probe Method N85-26789
ELECTROSTATIC WAVES
A method of solving the dispersion equation for electrostatic electron waves in magnetized plasma
[KGI-PREPRINT-071] N85-27697
ELEVATORS (CONTROL SURFACES)
Application of linear optimal control theory to the design of the elevator control system of the DHC-2 Beaver experimental aircraft
[VTH-LR-411] N85-26729
ELLIPTIC FUNCTIONS
Incorporation of an elliptical boundary condition into the program POISSON
[DE85-006820] N85-27564
ELLIPTICAL ORBITS
Integrable cases of restricted doubly averaged 3-body problem N85-26776
The 6 pi-periodic solutions of plane restricted elliptical 3-body problem in neighborhood of libration points N85-26779
ELONGATION
Magnetic method of inspecting mechanical properties of general purpose tubes
[BLL-M-36084-(5828.4)] N85-27235
EMISSION
Review of national emission standards for mercury
[PB85-153906] N85-27406
ENERGETIC PARTICLES
Substorms in energetic radiation belt particles according to data from Meteor artificial Earth satellite N85-26788
ENERGY ABSORPTION
Energy deposition from particle beams
[DE85-007382] N85-27654
ENERGY BANDS
Electronic density of states for the double donor system Si:P, As
[INPE-3447-PRE/700] N85-27700
ENERGY CONSERVATION
Planning fuel-conservative descents in an airline environmental using a small programmable calculator: Algorithm development and flight test results
[NASA-TP-2393] N85-26705
General continuous formulations of atmospheric energy laws N85-27448
ENERGY CONVERSION
Exploratory wind-tunnel investigation of a wingtip-mounted vortex turbine for vortex energy recovery
[NASA-TP-2468] N85-26667
Water brake convertor: A simple device to convert mechanical energy into heat energy
[DE85-006021] N85-26766
General continuous formulations of atmospheric energy laws N85-27448
ENERGY CONVERSION EFFICIENCY
Solar elements with distributed parameters N85-27036
Documentation and solar cell modules
[NASA-CR-175769] N85-27384
Design and development of a linear Fresnel lens air-cooled photovoltaic module and a stand-alone photovoltaic collector array
[DE85-006854] N85-27391
Selection of promising sites for magma energy experiments
[DE85-006832] N85-27393
Overview of the 1985 NASA Lewis Research Center SP-100 free-piston Stirling engine activities
[NASA-TM-87028] N85-27769
ENERGY DISSIPATION
Energy deposition from particle beams
[DE85-007382] N85-27654
ENERGY DISTRIBUTION
Ionization energies of liquids from energy distribution, quantum yield and second derivative curves
[AD-A152210] N85-26946
Studies of hot B subdwarfs. Part 2: Energy distributions of three bright sdB/sdOB stars in the 950-5500 angstrom range
[NASA-CR-175854] N85-27775
ENERGY GAPS (SOLID STATE)
Shallow impurity cluster states in n-type semiconductors
[INPE-3495-PRE/732] N85-27699
ENERGY LEVELS
Fluorinated polyesters
[AD-D011611] N85-26968
Boson degrees of freedom in Fermion many-body systems
[DE85-006997] N85-27660
ENERGY POLICY
Transient behavior of a single-blade horizontal-axis wind turbine
[MBB-UD-421/84-O] N85-27737
ENERGY REQUIREMENTS
The use of heat pumps in district heat supply
[BLL-OA-TRANS-2728-(6196.3)] N85-27163
Studies related to the deep Earth gas: 1983
[PB85-171114] N85-27373
ENERGY STORAGE
Advanced energy storage systems
[AD-A152244] N85-26915
Low pressure storage of methane on interlayered clays for potential vehicular applications
[DE85-006949] N85-27017

ENERGY TECHNOLOGY
USSR report: Engineering and equipment
[JPRS-UEQ-84-006] N85-27035
Parametric study of potential early commercial power plants Task 3-A MHD cost analysis
[NASA-CR-175839] N85-27377
Wind energy technology program summary
[DE85-007349] N85-27392
Current alternative energy research and development in Illinois
[PB85-163137] N85-27397
Energy data base: Subject thesaurus
[DE84-010568] N85-27761

ENERGY TRANSFER
Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208
Electric field and energy transfer by magnetopause reconnection
[INPE-3448-PRE/701] N85-27432
Rotational energy transfer in highly vibrationally excited hydrogen fluoride and deuterium fluoride
[AD-A152003] N85-27650
Energy reflection coefficient for H+ ions at energies between 10 and 80 keV
[DE85-007547] N85-27662

ENGINE DESIGN
Ceramic technology for advanced heat engines project
[DE85-004798] N85-27002

ENGINE MONITORING INSTRUMENTS
Advanced High Pressure O2/H2 Technology
[NASA-CP-2372] N85-26862

ENGINE PARTS
Advanced High Pressure O2/H2 Technology
[NASA-CP-2372] N85-26862
Manufacturing and producibility technology N85-26866
Ceramics for advanced O2/H2 application N85-26868
Vacuum plasma coatings for turbine blades N85-26869
Properties and microstructures for dual alloy combinations of three superalloys with alloy 901
[NASA-TM-86987] N85-26963
Ceramic technology for advanced heat engines project
[DE85-004798] N85-27002

ENGINEERING DRAWINGS
Water brake convertor: A simple device to convert mechanical energy into heat energy
[DE85-006021] N85-26766

ENGLISH LANGUAGE
Character recognition using correlation techniques
[AD-A152006] N85-27549

ENGRAVING
Automatic engraving of map frames in the revision of the TK 25, 1:25,000 topographical map N85-27362

ENVIRONMENT EFFECTS
Oil resistant silicone elastomers
[AD-131523] N85-26987
Acid rain: Effects on fish and wildlife
[PB85-154672] N85-27402
Impact of ozone on vegetation
[PB85-159937] N85-27403

ENVIRONMENTAL ENGINEERING
Design of computer-related workstations in relation to job functions and productivity
[AD-A151938] N85-27534

ENVIRONMENTAL MONITORING
The impact of weather on aviation safety
[GPO-35-520] N85-26685
Shuttle imaging radar-A (SIR-A) data analysis — geology of the Ozark Plateau of southern Missouri, land use in western Illinois, and vegetation types at Koonamore Station, Australia
[NASA-CR-175785] N85-27324
Monitoring of marine environment N85-27341
Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic N85-27355
Location and data collection satellite system ARGOS. User's guide — satellite based localization N85-27371

EPIDEMIOLOGY
Review of epidemiological studies of human exposures to radiofrequency radiation N85-27134

EPOXY RESINS
Characterization-curing-property studies of HBRF 55A resin formulations
[NASA-CR-175836] N85-26989
Evaluation of experimental epoxy monomers
[NASA-TM-87476] N85-26998

EQUATIONS OF MOTION
Optimum rotation of solid body with 1 axis of symmetry N85-26781
Identification and control of structures in space
[NASA-CR-175790] N85-26850
Effects of bearing deadbands on bearing loads and rotor stability N85-26889

EQUATIONS OF STATE
Equation of state and two-body correlations for fluids of non-spherical molecules
[AD-A151969] N85-27174

EQUATORIAL ATMOSPHERE
Determining effective rate of plasma heating in outer equatorial ionosphere using data from ISIS-1 and ISIS-2 satellites N85-26797
Dependence of equatorial F-region plasma bubble rise velocity and dynamo electric field on solar cycle
[INPE-3439-PRE/696] N85-27434

EQUATORIAL REGIONS
A study of the generation mechanisms of high latitude and equatorial F-region irregularities using DE-2 data
[NASA-CR-175745] N85-27423
Equatorial F-region irregularity latitudinal extension and dynamo electric field
[INPE-3494-PRE/731] N85-27433

ERGODIC PROCESS
Sensitivity of the stationary distribution vector for an ergodic Markov chain
[DE85-006979] N85-27621

ERROR ANALYSIS
Laser gyroscope random walk determination using a fast filtering technique N85-26847
Simulation of a low orbit restitution. Covariance analysis of the position-velocity by Doppler and accelerometer measurements
[CNES-CT/DTI/MS/AE/166] N85-26836
An evaluation of the performance of a new storm tracking methodology
[AD-A152234] N85-27484

ERROR SIGNALS
Ziv-Zakai bound applied to an amplitude-comparison monopulse radar
[AD-A151937] N85-27118

ERRORS
The effect of inaccuracies in structural models on the control of large space structures
[AD-A151794] N85-26858
Estimates of errors of a gyroscope stabilized platform N85-27050
Radial orbit error spectrum for Topex N85-27292
Synthetic aperture side-looking radar image adjustment N85-27304
Error reduction program — combustor performance evaluation codes
[NASA-CR-174776] N85-27584
Inherent magnetic field error measurements in ELMO Bumpy Torus
[DE85-005855] N85-27685

ERYTHROCYTES
Research opportunities in loss of red blood cell mass in space flight
[NASA-CR-175808] N85-27517

ESCAPE SYSTEMS
Generalized escape system simulation: Its purpose, recent modifications and potential
[DE85-005571] N85-26689

ESCHERICHIA
Structural-functional changes in bacterial cells under spaceflight conditions N85-26812

ESTIMATES
Sensitivity of conditions for lumping finite Markov chains
[AD-A152122] N85-27604
Formulas for updating the generalized inverse of a symmetric matrix perturbed by a symmetric rank 2 matrix composed of 2 nonsymmetric DYADS
[AD-A151736] N85-27629

ESTIMATING
Estimation of launch vehicle performance parameters
[AD-A151927] N85-26839
A data based algorithm for choosing the window width when estimating the integral of f2(x)
[AD-A152093] N85-27553
Some new estimation methods for weighted regression when there are possible outliers
[AD-A152104] N85-27602
Multivariable statistical modelling and its application N85-27617

ESTUARIES
Ecology of Pamlico River, North Carolina: An estuarine profile
[PB85-155703] N85-27404
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405

ETHYLENE COMPOUNDS
Ionization energies of liquids from energy distribution, quantum yield and second derivative curves
[AD-A152210] N85-26946

ETHYLENE OXIDE
Ion and polymer chain motion in a superionic sodium-poly(ethylene oxide) complex
[AD-A152290] N85-27001

EULER EQUATIONS OF MOTION
Redistribution of the inlet temperature profile through the SSME fuel turbine N85-26901
Evaluation of an algorithm for the solution of the time-dependent Euler equations
[AD-A151993] N85-27600

EUROPE
East Europe report: Science and technology
[JPRS-ESA-84-032] N85-26833

EUROPEAN COMMUNICATIONS SATELLITE
Station for in-orbit testing of satellites
[MBB-UR-708/84-O] N85-27733

EUROPEAN SPACE AGENCY
European space science horizon 2000
[ESA-SP-1070] N85-26771

EUROPEAN SPACE PROGRAMS
European space science horizon 2000
[ESA-SP-1070] N85-26771

EUTECTIC ALLOYS
Dissolution of solid solutions in absence of internal mass transfer
[BLL-M-36092-(5828.4)] N85-26959
Ca-Ga, Sr-Ga and Ba-Ga binary systems
[DE85-006454] N85-26960

EVALUATION
An evaluation of the performance of a new storm tracking methodology
[AD-A152234] N85-27484
Evaluation of the PROFS (Program for Regional Observing and Forecasting Services) 1982, real-time forecast experiment
[PB85-159747] N85-27495

EVAPORATORS
Operation of a low temperature absorption chiller at rating point and at reduced evaporator temperature
[DE85-006306] N85-27030

EXCIMER LASERS
Flat-plate solar array project process development area: Process research of non-CZ silicon material
[NASA-CR-175777] N85-27382

EXCITONS
Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208

EXERCISE PHYSIOLOGY
Comparative anaerobic power of males and females
[AD-A151960] N85-27523

EXHAUST EMISSION
Emission inventory applications to regional acid deposition modeling
[PB85-157366] N85-27033
Air quality benefit analysis for Los Angeles and San Francisco based on housing values and visibility
[PB85-166049] N85-27409
Effect of traffic and meteorology on air pollution N85-27452

EXHAUST GASES
Transformation of nitrogen oxides while sampling combustion products
[AD-A152184] N85-26945
Measurements of two-phase exhaust flow parameters of a small caliber gun associated with muzzle flash phenomena
[ISL-CO-212/83] N85-27182

EXHAUST VELOCITY
Estimation of launch vehicle performance parameters
[AD-A151927] N85-26839

EXOBIOLOGY
Aerospace medicine and biology: A continuing bibliography with indexes, supplement 271, May 1985
[NASA-SP-7011(271)] N85-27514

EXPERIMENT DESIGN
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology
[AD-A151956] N85-27548

EXPERT SYSTEMS
Diagnosis: Using automatic test equipment and an artificial intelligence expert system
[AD-A151918] N85-27576
Artificial intelligence in space platforms
[AD-A152078] N85-27578

EXPLODING WIRES
Lightning strikes on aircraft. The TRIP 82 experiment and 3-dimensional electromagnetic interferometry
[ONERA-RF-88/7154-PY] N85-26690

Detonation velocity measurements of the explosives Datasheet C and Amatol
[AD-A152298] N85-27015

EXPLOSIONS
Empirical development of ground acceleration, velocity and displacement for accidental explosions at J5 or the proposed large altitude rocket cell at Arnold Engineering Development Center
[DE85-008324] N85-27020
Pyrotechnic shock simulation using the controlled response of a resonating bar fixture
[DE85-006537] N85-27181

EXPLOSIVE FORMING
Influence of behavior laws in the explosive deformation of metal plates
[ISL-R-122/83] N85-27032

EXPLOSIVES
Detonation velocity measurements of the explosives Datasheet C and Amatol
[AD-A152298] N85-27015
Surveillance program for the dissection and analysis of explosive and pyrotechnic components
[DE85-006105] N85-27016
A review of safety practices and safety training for the explosives field
[AD-A152295] N85-27028
Inversion of Rayleigh wave group velocities from high-explosive tests
[AD-A152172] N85-27175

EXPOSURE
Damage caused to polyurethane foams by aging, simulated sunlight exposure, heat and fire
[AD-A152040] N85-26998
Experiments in microwave exposure in the rat: Body temperature, serum chemistry and the use of chemical restraint
[PB85-156834] N85-27512

EXTENSOMETERS
Some advances in experimentation supporting development of viscoplastic constitutive models
[NASA-CR-174855] N85-27260

EXTERNAL STORES
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 2. Program compilation
[AD-A152271] N85-26703
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 1: User's manual
[AD-A152268] N85-26725
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 2: Final report on program enhancement and delivery
[AD-A152269] N85-26726
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 1: Program compilation
[AD-A152270] N85-26727

EXTERNAL TANKS
Development of acceptance criteria for batches of silane primer for external tank thermal protection system bonding applications
[NASA-CR-175850] N85-26995

EXTINCTION
SAM II measurements of the polar stratospheric aerosol. Volume 6: April to October 1981
[NASA-RP-1141] N85-27422

EXTRACTION
Parachute extraction device for ultralight gliders
[CH-643499-A5] N85-26663

EXTRATERRESTRIAL RESOURCES
Studies on the processing methods for extraterrestrial materials
[NASA-CR-175778] N85-26768
Hydrogen recovery from extraterrestrial materials using microwave energy
[DE85-006717] N85-27789

EYE (ANATOMY)
The 10 MWe solar thermal central receiver pilot plant: Beam safety tests and analyses
[SAND-83-8035] N85-27379

F

F REGION
Influence of tropical F region in ionosphere on propagation of short radio waves N85-26798
A study of the generation mechanisms of high latitude and equatorial F-region irregularities using DE-2 data
[NASA-CR-175745] N85-27423
Equatorial F-region irregularity latitudinal extension and dynamo electric field
[INPE-3494-PRE/731] N85-27433
Dependence of equatorial F-region plasma bubble rise velocity and dynamo electric field on solar cycle
[INPE-3439-PRE/666] N85-27434

F-15 AIRCRAFT
Diagnosis: Using automatic test equipment and an artificial intelligence expert system
[AD-A151918] N85-27576

F-16 AIRCRAFT
Flight control system reconfiguration design using quantitative feedback theory
[AD-A151771] N85-26722

F-27 AIRCRAFT
Static longitudinal stability and control characteristics of the Fokker F27 Friendship calculated by simple handbook methods
[VTH-LR-394] N85-26728

F-106 AIRCRAFT
Comparison of wind velocity in thunderstorms determined from measurements by a ground-based Doppler radar and an F-106B airplane
[NASA-TM-86348] N85-26687

F-111 AIRCRAFT
Automatic flight control modes for the AFTI/F-111 mission adaptive wing aircraft N85-26756

FABRICATION
Development of a new faster process for the fabrication of ceramic fiber-reinforced ceramic composites by chemical vapor infiltration
[DE85-007550] N85-27007
Method of fabricating acceleration resistant crystal resonators and acceleration resistant crystal resonators so formed
[AD-D011630] N85-27145
Method of fabricating material for the electrodes of gas discharge devices
[DE85-007452] N85-27157

FABRY-PEROT INTERFEROMETERS
Thermospheric winds observed by OI6300A Doppler shifts at 23 deg S in the Brazilian sector
[INPE-3384-RPE/470] N85-27479

FADDEEV EQUATIONS
Configuration space Faddeev calculations
[DE85-005813] N85-27721

FAILURE ANALYSIS
How to handle failures in advanced flight control systems of future transport aircraft N85-26752
Recent failures of weather satellites
[S-HRG-98-1070] N85-26855
Reusable rocket engine turbopump condition monitoring N85-26907

FAILURE MODES
Signal analysis techniques for incipient failure detection in turbomachinery N85-26884
The effects of pin elasticity, clearance, and friction on the stresses in a pin-loaded orthotropic plate
[NASA-CR-175816] N85-26927
Creep-fatigue interaction of notched 304 stainless steel bars N85-27249
Determination of failure characteristics of materials and structures
[AD-A152073] N85-27266
Photovoltaic cell reliability research: Investigation of accelerated stress factors and failure-degradation mechanisms in terrestrial solar cells
[NASA-CR-175815] N85-27388

FAN BLADES
Numerical analyses in aerodynamic design of aero-engine fan N85-26618

FAR ULTRAVIOLET RADIATION
Studies of collisional and nonlinear radiative process for development of coherent UV and XUV sources
[AD-A152001] N85-27670

FARADAY EFFECT
The Faraday rotation experiment — solar corona N85-27805

FARM CROPS
Evaluation of the area and severity of last night's frosts
[REPT-109] N85-27473

FATIGUE (MATERIALS)
Fatigue criterion to system design, life and reliability
[NASA-TM-87017] N85-27226
Fatigue damage and small crack growth during biaxial loading N85-27247
Creep-fatigue interaction of notched 304 stainless steel bars N85-27249
Elevated temperature biaxial fatigue
[NASA-CR-175795] N85-27263
Initiation, growth and coalescence of small fatigue cracks
[AD-A151799] N85-27265
The practical and theoretical significance of small cracks: An evaluation
[VTH-LR-432] N85-27283

FATIGUE LIFE
A review of fracture mechanics life technology N85-26863
Fatigue life extension N85-26864
Thrust chamber life prediction N85-26865
Rolling contact fatigue life of chromium ion plated 440C bearing steel N85-26882
Fatigue life analysis of a turboprop reduction gearbox
[NASA-TM-87014] N85-27228

FATIGUE TESTS
Initial quality of advanced joining concepts
[AD-A152241] N85-27027

FAULT TOLERANCE
An abstract specification language for Markov reliability models
[NASA-TM-86423] N85-27616

FEASIBILITY ANALYSIS
A feasibility study for using low boiling point fluids to change aircraft tire deflection
[AD-A152096] N85-26701
Feasibility study on Laser Doppler Anemometer (LDA) wind velocity measurements using pulsed visible laser light
[ISL-CO-224/83] N85-27489
Preliminary technology utilization assessment of the robotic fruit harvester
[NASA-CR-175834] N85-27532
On various Fourier series utilized for solution of structural mechanics problems
[VTH-LR-429] N85-27615

FECES
Preliminary assessment of climatic change during late Wisconsin time, southwest Great Basin and vicinity, Arizona, California and Nevada
[DE85-008343] N85-27488

FEDERAL BUDGETS
Department of Housing and Urban Development-independent agencies appropriations for 1986. Part 6: National Aeronautics and Space Administration
[GPO-47-235] N85-27768

FEEDBACK
Positioning of a robotic manipulator through the use of visual feedback
[AD-A151933] N85-27577

FEEDBACK CONTROL
Flight control system reconfiguration design using quantitative feedback theory
[AD-A151771] N85-26722
Application of linear optimal control theory to the design of the elevator control system of the DHC-2 Beaver experimental aircraft
[VTH-LR-411] N85-26729
Flight testing and development of the F/A-18A digital flight control system N85-26743
OLGA: An open loop gust alleviation N85-26744
Optimal open loop and nonlinear feedback control for remote orbital capture
[AD-A151967] N85-26859
Nonintrusive shaft speed sensor N85-26908
Digital RF delay line for ECM (electronic countermeasure) look-through
[AD-A152120] N85-27120
Development of graphical time response using the OPTSYSX program
[AD-A152221] N85-27557

FEMALES
Cosmonaut Savitskaya says many women in cosmonaut training N85-26774
Comparative anaerobic power of males and females
[AD-A151960] N85-27523

FERMIONS
Canonical analysis of the fermion sector in higher-derivative supergravity
[DE85-007828] N85-27635
Boson degrees of freedom in Fermion many-body systems
[DE85-006997] N85-27660
Microscopic analysis of angular momentum projected HFB-states in terms of interacting bosons
[DE85-007629] N85-27661
Comment on quantum effects on 4-dimensional space-time symmetries
[DE85-007780] N85-27722

FERRITES
Effects of wear on structure-sensitive magnetic properties of ceramic ferrite in contact with magnetic tape
[NASA-TM-87007] N85-26991

FERRITIC STAINLESS STEELS
Rapid solidification of candidate ferritic steels
[DE85-006596] N85-26971

FERTILITY
Microbial ecology of extreme environments: Antarctic yeasts and growth in substrate-limited habitats
[NASA-CR-175810] N85-27509

FIBER COMPOSITES
Mechanical jointing in Aramid fiber composites: An experimental study
[VTH-LR-371] N85-27280
FIBER OPTICS
Fiber optic Raman thermometer for Space Shuttle main engine preburner profiling N85-26904
Reusable rocket engine turbopump condition monitoring N85-26907
Wavelength multiplexer-demultiplexer
[AD-D011608] N85-27140
Phase-lock fiber optic interferometer
[AD-D011603] N85-27191
The utilization of optical fibers in holography
[ISL-R-102/83] N85-27196
Ultrafast holography using optical fibers
[ISL-CO-238/83] N85-27204
In-situ stratospheric ozone measurements: Recent results and their implications N85-27419
A study of topologies and protocols for fiber optic local area network
[NASA-CR-175771] N85-27669
FIBER REINFORCED COMPOSITES
Design overview of fiber-reinforced superalloy composites for the Space Shuttle main engine N85-26871
Nonlinear structural analysis for fiber-reinforced superalloy turbine blades N85-26887
NASA/aircraft industry standard specification for graphite fiber toughened thermoset resin composite material
[NASA-RP-1142] N85-26923
Effect of low-velocity or ballistic impact damage on the strength of thin composite and aluminum shear panels
[NASA-TP-2441] N85-26924
Durability of Aramid reinforced aluminum laminate (ARALL)
[VTH-LR-423] N85-26933
The effect of low sheet thicknesses on the fracture toughness of an Al alloy (7075-T6) --- Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-425] N85-26984
Development of a new faster process for the fabrication of ceramic fiber-reinforced ceramic composites by chemical vapor infiltration
[DE85-007550] N85-27007
The application of BRILES rivets for mechanical jointing of Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-367] N85-27279
FIELD EFFECT TRANSISTORS
Impurity bands associated with MOS inversion layers
[INPE-3483-PRE/726] N85-27704
A study of Ga(.47)In(.53)As and Al(.48)In(.52)As for very high frequency device applications
[AD-A151995] N85-27706
Effect of dislocations on gallium arsenide FETs
[AD-A152249] N85-27709
FIELD THEORY (PHYSICS)
Neutrino measurements on the Moon
[DE85-007700] N85-27791
FIGHTER AIRCRAFT
Some aspects of how to design cost-effective flight control systems N85-26639
Application of AFTI/F-16 task-tailored control modes in advanced multirole fighters N85-26735
The STOL and maneuver technology program integrated control system N85-26757
Some aspects of how to design cost-effective flight control systems
[MBB-LKE-32/S/PUB/143] N85-27729
FILE MAINTENANCE (COMPUTERS)
An adaptive technique and its application in database design N85-27748
FILM CONDENSATION
Filmwise condensation of steam on low integral-finned tubes
[AD-A152220] N85-27176
FINITE DIFFERENCE THEORY
Some numerical analyses of flows with separation N85-26616
Finite-difference computations of rotor loads
[NASA-TM-86682] N85-26669
A computer analysis program for interfacing thermal and structural codes
[NASA-TM-87021] N85-27264
Error reduction program --- combustor performance evaluation codes
[NASA-CR-174776] N85-27584
Evaluation of an algorithm for the solution of the time-dependent Euler equations
[AD-A151993] N85-27600
FINITE ELEMENT METHOD
Two computational methods for cascade flows N85-26617
The effect of inaccuracies in structural models on the control of large space structures
[AD-A151794] N85-26858
Theoretical and experimental comparisons of nearfield electrogalvanic fields due to nonlinear polarization layers
[AD-A152085] N85-27149
Solution of Onsager's equation for a rotating compressible fluid in a multiply-connected domain
[DE85-007048] N85-27178
Computer modeling of vibrational energy levels of potential laser candidates (diatomic molecules)
[AD-A151765] N85-27209
Automatic tracking of crack growth via finite elements N85-27246
Finite axisymmetric deformation of a thin shell of revolution N85-27251
A computer analysis program for interfacing thermal and structural codes
[NASA-TM-87021] N85-27264
The nonlinear analysis of thick composite plates using a cubic spline function
[AD-A152115] N85-27268
Numerical resolution calculation for elastic-plastic impact problems
[AD-A152292] N85-27270
Hopkinson bar simulation using DYNA2D
[DE85-006766] N85-27275
Stress analysis of the space telescope focal plane structure joint
[NASA-CR-175797] N85-27284
A general purpose scatter storage subsystem and a comparison of hashing methods
[NASA-CR-175814] N85-27542
Finite elements and the method of conjugate gradients on a concurrent processor
[NASA-CR-175812] N85-27588
Analysis of the convergence of mixed finite element methods
[HTKK-MAT-A227] N85-27613
FINITE VOLUME METHOD
Thermodynamic evaluation of transonic compressor rotors using the finite volume approach
[NASA-CR-175811] N85-26712
FIRE PREVENTION
Hazards in welding due to oxygen changes in the workplace atmosphere
[BLL-WI-TRANSL-684-(9312.57)] N85-27224
FISHERIES
Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic N85-27355
Ecology of Pamlico River, North Carolina: An estuarine profile
[PB85-155703] N85-27404
FISHES
Acid rain: Effects on fish and wildlife
[PB85-154672] N85-27402
FLAME PROPAGATION
Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935
LDA study of non-steady flame propagation in a constant volume duct
[DE85-007233] N85-26948
On the analytic calculation of premixed flames
[VTH-LR-417] N85-26954
Significant parameters for predicting flame spread
[PB85-178002] N85-27034
FLAME TEMPERATURE
On the analytic calculation of premixed flames
[VTH-LR-417] N85-26954
FLAMES
An experimental investigation of two-dimensional flame-vortex interactions N85-26934
Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935
FLAT PLATES
Turbulent flow of fluid near trailing edge of plate in stream at zero angle of attack N85-27057
Acceleration sensitivity reduction method
[AD-D011631] N85-27146
MOD silver metallization for photovoltaics
[NASA-CR-175773] N85-27381
FLEXIBILITY
Development of a new faster process for the fabrication of ceramic fiber-reinforced ceramic composites by chemical vapor infiltration
[DE85-007550] N85-27007
FLEXIBLE BODIES
Model reduction techniques applied to the control of large space structures
[AD-A151784] N85-26857
FLIGHT CHARACTERISTICS
Study of longitudinal landing flying qualities evaluation using pilot model theory
[AD-A152194] N85-26702
Technical evaluation report on the Flight Mechanics Symposium on Active Control Systems: Review, Evaluation and Projections
[AGARD-AR-220] N85-26730
The state-of-the-art and future of flight control systems N85-26732
FLIGHT CONTROL
Cost Effective and Affordable Guidance and Control Systems
[AGARD-CP-360] N85-26638
Some aspects of how to design cost-effective flight control systems N85-26639
Navigation: Accounting for copy N85-26641
A cost-efficient control procedure for the benefit of all airspace users N85-26651
Study of longitudinal landing flying qualities evaluation using pilot model theory
[AD-A152194] N85-26702
Flight control system reconfiguration design using quantitative feedback theory
[AD-A151771] N85-26722
A modern control design methodology with application to the CH-47 helicopter
[AD-A151946] N85-26723
The state-of-the-art and future of flight control systems N85-26732
A perspective on supersugmented flight control advantages and problems N85-26733
Aspects of application of ACT systems for pilot workload alleviation N85-26734
Application of AFTI/F-16 task-tailored control modes in advanced multirole fighters N85-26735
X-29A digital flight control system design N85-26736
ACT applied to helicopter flight control N85-26738
Some flight test results with redundant digital flight control systems N85-26739
An update on experience on the fly by wire Jaguar equipped with a full-time digital flight control system N85-26740
ACT flight research experience N85-26741
Operational and developmental experience with the F/A-18A digital flight control system N85-26742
Flight testing and development of the F/A-18A digital flight control system N85-26743
Active control technology experience with the Space Shuttle in the landing regime N85-26747
How to handle failures in advanced flight control systems of future transport aircraft N85-26752
Interactive design of specifications for airborne software set (GISELE) N85-26753
The flight control system for the Experimental Aircraft Programme (EAP) demonstrator aircraft N85-26755
Automatic flight control modes for the AFTI/F-111 mission adaptive wing aircraft N85-26756
The STOL and maneuver technology program integrated control system N85-26757
The evolution of active control technology systems for the 1990's helicopter N85-26758
Some aspects of how to design cost-effective flight control systems
[MBB-LKE-32/S/PUB/143] N85-27729
FLIGHT CREWS
Torso restraint system
[AD-D011609] N85-26684
Statistical study of the dynamic analysis of the workload in the A310 certification campaign N85-27531
FLIGHT HAZARDS
The impact of weather on aviation safety
[GPO-35-520] N85-26685
Aircraft accident report: United Airlines Flight 663, Boeing 727-222, N7647U, Denver, Colorado, May 31, 1984
[PB85-910405] N85-26686
FLIGHT MANAGEMENT SYSTEMS
Planning fuel-conservative descents in an airline environmental using a small programmable calculator: Algorithm development and flight test results
[NASA-TP-2393] N85-26705
FLIGHT OPTIMIZATION
Computer assisted flight schedule optimization
[AD-A151689] N85-27623
FLIGHT PATHS
A method of estimating aircraft attitude from fly by wire flight control system data N85-26653
Terrain following without use of forward looking sensors N85-26659
Generation of flight paths using heuristic search
[AD-A151949] N85-26694
Planning fuel-conservative descents in an airline environmental using a small programmable calculator: Algorithm development and flight test results
[NASA-TP-2393] N85-26705

Aspects of application of ACT systems for pilot workload alleviation N85-26734
Probabilistic computer model of optimal runway turnoffs
[NASA-CR-172549] N85-26760

FLIGHT SAFETY
The impact of weather on aviation safety
[GPO-35-520] N85-26685
Aircraft accident report: United Airlines Flight 663, Boeing 727-222, N7647U, Denver, Colorado, May 31, 1984
[PB85-910405] N85-26686

FLIGHT SIMULATION
Piloted simulation of one-on-one helicopter air combat at NOE flight levels
[NASA-TM-86686] N85-26720
The effect of load factor on aircraft handling qualities
[AD-A152118] N85-26724
Design and specification of a local area network architecture for use in real-time flight simulation
[AD-A152242] N85-26762
Flight Experiment Demonstration System (FEDS) functional description and interface document
[NASA-CR-175290] N85-26769
Research and development. Technical and scientific reports 1984 N85-27724
Advanced flight simulation for helicopter development
[MBB-UD-416/84-O] N85-27731

FLIGHT SIMULATORS
The evaluation of ACS for helicopters: Conceptual simulation studies to preliminary design N85-26737
Advanced flight simulation for helicopter development
[MBB-UD-416/84-O] N85-27731

FLIGHT TEST INSTRUMENTS
Flight test support aircraft Advanced Technologies Testing Aircraft System (ATTAS) for the DFVLR
[MBB-FE-732/S/PUB/154] N85-27730

FLIGHT TEST VEHICLES
Flight test support aircraft Advanced Technologies Testing Aircraft System (ATTAS) for the DFVLR
[MBB-FE-732/S/PUB/154] N85-27730

FLIGHT TESTS
Navigation and flight director guidance for the NASA/FAA helicopter MLS curved approach flight test program
[NASA-CR-177350] N85-26691
Planning fuel-conservative descents in an airline environmental using a small programmable calculator: Algorithm development and flight test results
[NASA-TP-2393] N85-26705
Development and flight test of a helicopter, X-band, portable precision landing system concept
[NASA-TM-86710] N85-26721
A modern control design methodology with application to the CH-47 helicopter
[AD-A151946] N85-26723
The effect of load factor on aircraft handling qualities
[AD-A152118] N85-26724
Some flight test results with redundant digital flight control systems N85-26739
Flight testing and development of the F/A-18A digital flight control system N85-26743
OLGA: An open loop gust alleviation N85-26744
Space Shuttle program communication and tracking systems interface analysis
[NASA-CR-171862] N85-26841
In-situ stratospheric ozone measurements: Recent results and their implications N85-27419
Station for in-orbit testing of satellites
[MBB-UR-708/84-O] N85-27733

FLIGHT TRAINING
Trends shaping advanced aircrew training capabilities through the 1990s
[AD-A152277] N85-27530

FLOOD PLAINS
Application of hierarchical data structures to geographical information systems
[AD-A152169] N85-27753

FLORIDA
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405

FLOW CHARACTERISTICS
Fuel and oxidizer turbine loss analysis N85-26900
Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California
[NASA-CR-3901] N85-27463
New flow physical aspects in aerodynamics
[MBB-FE-122/S/PUB/133] N85-27725

FLOW DISTRIBUTION
Navier-Stokes solution of hypersonic blunt-nosed body flowfields N85-26624
The role of computational fluid dynamics in aeronautical engineering N85-26629
A method for simulating 3-D aircraft flow fields with jet plume effects
[NASA-CR-175802] N85-26664
Application of CFD techniques toward the validation of nonlinear aerodynamic models
[NASA-TM-86715] N85-26671
Measurements in low pressure flow using an electronic beam detector — wind tunnel tests N85-26676
Turbulence characteristics of swirling flowfields
[NASA-CR-174918] N85-26717
Numerical analysis of flow non-uniformity in the hot gas manifold of the Space Shuttle main engine N85-26899
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
Simulation of interior ballistics flows in a shock tube
[ISL-CO-222/83] N85-27183
Structural stability and bifurcation in conical flow fields
[VTH-LR-424] N85-27282

FLOW EQUATIONS
Solution of Onsager's equation for a rotating compressible fluid in a multiply-connected domain
[DE85-007048] N85-27178

FLOW GEOMETRY
Computational aerodynamics in designing aircraft N85-26622

FLOW MEASUREMENT
Measurements in low pressure flow using an electronic beam detector — wind tunnel tests N85-26676
Measurements of two-phase exhaust flow parameters of a small caliber gun associated with muzzle flash phenomena
[ISL-CO-212/83] N85-27182

FLOW STABILITY
Instability of solar wind near streamlined bodies N85-26794
Vortex shedding flowmeters for liquids at high flow velocities N85-26906
A numerical study of nonspherical black hole accretion N85-27780

FLOW THEORY
Computational aerodynamics in designing aircraft N85-26622
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-2, 219/March-April
[ESA-TT-878] N85-26635
Conical stagnation points in the flow around an external corner — delta wings
[VTH-LR-396] N85-26680
New flow physical aspects in aerodynamics
[MBB-FE-122/S/PUB/133] N85-27725

FLOW VELOCITY
Fuel and oxidizer turbine loss analysis N85-26900
Vortex shedding flowmeters for liquids at high flow velocities N85-26906
Aerodynamic forces developing in channels between vases in turbine drive wheels N85-27062
Flow rate and pressure profiles for 1 to 4 axially alined orifice inlets
[NASA-TP-2460] N85-27165

FLOW VISUALIZATION
Simulation of interior ballistics flows in a shock tube
[ISL-CO-222/83] N85-27183

FLOWMETERS
Vortex shedding flowmeters for liquids at high flow velocities N85-26906

FLUID DYNAMICS
Progress of computational fluid dynamics in the world N85-26612
Flow dynamic environment data base development for the SSME N85-26885
Experimental evaluation of an advanced Space Shuttle main engine hot-gas manifold design concept N85-26898
Analytical study of flow phenomena in SSME turnaround duct geometries N85-26902
Liquid rocket combustor computer code development N85-26910
Laser Schlieren and ultraviolet diagnostics of rocket combustion N85-26911
USSR report: Engineering and equipment
[JPRS-UEQ-84-006] N85-27035
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172
A study of the effect of gently varying terrain on atmospheric flow near the surface N85-27411
Fluid-dynamic model of a downburst
[UTIAS-271] N85-27441
Air flow of the western coastal boundary of South Africa and its influence on the ocean N85-27459

FLUID JETS
Fluid-dynamic model of a downburst
[UTIAS-271] N85-27441

FLUID MECHANICS
Adaptive grid generation for numerical solution of Burger's equation
[AD-A152217] N85-27606

FLUID TRANSMISSION LINES
Dynamic response of fluid transmission lines
[AD-A151926] N85-27171

FLUIDICS
Dynamic response of fluid transmission lines
[AD-A151926] N85-27171

FLUORESCENCE
Water vapor N85-27420

FLUORINATION
Fluorinated polyesters
[AD-D011611] N85-26988

FLUTTER
Aerodynamic detuning analysis of an unstalled supersonic turbofan cascade
[NASA-TM-87001] N85-26670
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 2. Program compilation
[AD-A152271] N85-26703
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 1: User's manual
[AD-A152268] N85-26725
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 2: Final report on program enhancement and delivery
[AD-A152269] N85-26726
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 1: Program compilation
[AD-A152270] N85-26727

FLUX (RATE)
Periodicity of variations in galactic cosmic ray fluxes and solar activity parameters near 20th cycle minimum N85-26791
Variations in intensity of secondary cosmic radiation observed on 10-11 August 1981 N85-26796
Measurements of fluxes of high-energy protons and electrons by 2 oppositely oriented spectrometers aboard Cosmos-368 artificial Earth satellite N85-26800
On the choice of coordinates for semiconductor simulation
[AD-A152214] N85-27708

FLUX DENSITY
Dual electrochemical system
[AD-D011616] N85-27376
Investigation of pseudo bi-polar nickel cadmium batteries as filler elements for pulsed power loads
[AD-A152112] N85-27389
High efficiency ionizer using a hollow cathode discharge plasma
[DE85-006690] N85-27693

FLY BY WIRE CONTROL
A method of estimating aircraft attitude from fly by wire flight control system data N85-26653
An update on experience on the fly by wire Jaguar equipped with a full-time digital flight control system N85-26740

FLYBY MISSIONS
TASS update on flights of Vega-1 and Vega-2 N85-26803
Kovtunenko discusses Vega Project N85-26804

FOAMS
Atmospheric frontal zone studies
[NASA-CR-175293] N85-27469

FOCI
New focal plane detector system for the broad range spectrometer
[DE85-005370] N85-27201

FOG
Fog advection in the Namib N85-27454

FOKKER-PLANCK EQUATION
Kinetic theory and simulation of multi-species plasmas in Tokamaks excited with ICRF microwaves
[DE85-008119] N85-27691

FORECASTING
Satellite provided customer promises services, a forecast of potential domestic demand through the year 2000. Volume 4: Sensitivity analysis
[NASA-CR-174662] N85-27092
Use of forest modeling to project acid rain effects
[DE85-005251] N85-27400
An evaluation of discretized conditional probability and linear regression threshold techniques in model output statistics forecasting of visibility over the north Atlantic Ocean
[AD-A151955] N85-27619

FORESTS
Use of forest modeling to project acid rain effects
[DE85-005251] N85-27400

FORGING
Automatic manipulators for forging rollers N85-27042
Industrial robots and automatic manipulators for forging and pressing operations at Second International Exhibition N85-27044
FORM FACTORS
Paramagnetic form factors from itinerant electron theory
[DE85-005272] N85-26973
FORMAT
Design of an interface to an information retrieval network N85-27750
FORMULAS (MATHEMATICS)
Consolidation theory with consideration of frame plasticity
[REPT-9/1984] N85-27240
Formulas for updating the generalized inverse of a symmetric matrix perturbed by a symmetric rank 2 matrix composed of 2 nonsymmetric DYADS
[AD-A151736] N85-27629
FORTRAN
Recent trends in software technology for vector processors N85-26615
Pulsewidth modulated speed control of brushless dc motors
[AD-A151966] N85-27148
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology
[AD-A151956] N85-27548
Development of graphical time response using the OPTSYSX program
[AD-A152221] N85-27557
FOSSILS
Preliminary assessment of climatic change during late Wisconsin time, southwest Great Basin and vicinity, Arizona, California and Nevada
[DE85-008343] N85-27488
FOUNDATIONS
Repair of the DSS-14 pedestal concrete N85-27108
FOURIER ANALYSIS
Analysis of short-period changes in intensity of hard X-radiation of solar flares registered aboard Venera-13 and Venera-14 spacecraft N85-26806
The development and implementation of an optical communications laboratory
[AD-A151682] N85-27111
FOURIER SERIES
On various Fourier series utilized for solution of structural mechanics problems
[VTH-LR-429] N85-27615
FOURIER TRANSFORMATION
An experimental investigation of two-dimensional flame-vortex interactions N85-26934
Fourier transform infrared spectrophotometric analysis of resin mix stoichiometry, revision 1
[DE85-007272] N85-26951
Techniques for computing the DFT using the residue Fermat number systems and VLSI N85-27097
FRACTURE MECHANICS
A review of fracture mechanics life technology N85-26863
Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26928
Multiaxial and thermomechanical fatigue considerations in damage tolerant design
[NASA-TM-87022] N85-26964
Automatic tracking of crack growth via finite elements N85-27246
Full statistical characteristics of microdeformation
[BLL-M-36076-(5828.4)] N85-27254
Predicting fully plastic mode 2 crack growth from an asymmetric defect
[AD-A152227] N85-27269
FRACTURE STRENGTH
Particulate and whisker toughened alumina composites
[DE85-005239] N85-26930
Simultaneous chemical vapor deposition of SiC-dispersed phase composites
[DE85-007751] N85-26931
The effect of low sheet thicknesses on the fracture toughness of an Al alloy (7075-T6) --- Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-425] N85-26984
An improved torsional method for determining the fracture toughness of stiff materials and of adhesive joints
[AD-A152091] N85-27267
FRACTURES (MATERIALS)
Creep-fatigue interaction of notched 304 stainless steel bars N85-27249
FREE FLOW
Study of the coupling between average, coherent and turbulent fields in a circular excited free jet
[ISL-R-115/83] N85-27184
Computation model of turbulent free flow: Application to axisymmetric jets
[ISL-R-126/83] N85-27185
Analyses of orderly structures in jets and the relationship with emitted noise
[ISL-R-117/83] N85-27648
FREE JETS
An automatic traversing system for Laser Doppler Anemometer (LDA) applications to wind tunnels and to free jets
[ISL-CO-225/83] N85-27490
FREE RADICALS
Free radicals in the stratosphere: A new observational technique N85-27415
Role and fate of ozone in the atmosphere N85-27421
FREEZING
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe
[NASA-CR-174840] N85-27012
FREON
A feasibility study for using low boiling point fluids to change aircraft tire deflection
[AD-A152096] N85-26701
Special features of the temperature dependence of the capillary constant in the vicinity of the critical point
[BLL-T6438/BG/LRS/LRST750/85] N85-27632
FREQUENCIES
An atlas of pure water vapor spectra from 500 to 5000/cm, Volume 2
[AD-A151757] N85-26940
FREQUENCY ASSIGNMENT
Optimal frequencies for broadcast transmitters in the UHF domain: Report
[TUM-M8404] N85-27088
Generalized graph coloring: A frequency assignment method for VHF broadcasting
[TUM-M8405] N85-27535
FREQUENCY CONVERTERS
Lidar ER2 (ozone). Crystal characterization for harmonic conversion --- laser systems
[CERT-2/6129-00] N85-27717
FREQUENCY HOPPING
Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208
FREQUENCY RANGES
The medical results of human exposures to radio frequency radiation N85-27133
FREQUENCY RESPONSE
Application of the hydraulic system frequency response program to propellant feed systems
[AD-A151824] N85-26914
FREQUENCY SHIFT
Acceleration-resistant crystal resonator
[AD-D011627] N85-27144
FREQUENCY STANDARDS
Maintenance of time and frequency in the DSN using the global positioning system N85-27105
FRESNEL LENSES
Design and development of a linear Fresnel lens air-cooled photovoltaic module and a stand-alone photovoltaic collector array
[DE85-006854] N85-27391
FRICTION
Metal armatures for railguns
[AD-A152129] N85-26838
Breakway friction and dynamic friction/wear measurements of various ceramic materials from 25 C (75 F) to 650 C (1200 F)
[NASA-CR-174803] N85-26994
FRICTION FACTOR
Turbine blade friction damping study N85-26886
FRONTS (METEOROLOGY)
A survey of major east coast snowstorms, 1960-1983. Part 2. Summary of surface and upperlevel characteristics
[NASA-TM-86195] N85-27471
A survey of major east coast snowstorms, 1960-1983. Part 2: Case studies of eighteen storms
[NASA-TM-86196] N85-27472
FROST DAMAGE
Evaluation of the area and severity of last night's frosts
[REPT-109] N85-27473
FRUITS
Preliminary technology utilization assessment of the robotic fruit harvester
[NASA-CR-175834] N85-27532
FUEL COMBUSTION
Analytical fuel property effects--small combustors
[NASA-CR-174738] N85-26709
FUEL CONSUMPTION
Planning fuel-conservative descents in an airline environmental using a small programmable calculator: Algorithm development and flight test results
[NASA-TP-2393] N85-26705
FUEL PRODUCTION
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe
[NASA-CR-174840] N85-27012
Technical and economic analysis of liquid fuel production from microalgae
[DE85-002926] N85-27018
FUEL PUMPS
Ceramics for advanced O2/H2 application N85-26868
FUNCTION SPACE
Quadratic spaces over discrete Hodge algebras N85-27593
FUNCTIONALS
A data based algorithm for choosing the window width when estimating the integral of f2(x)
[AD-A152093] N85-27553
Stability of functionals determined by moment conditions
[TRITA-NA-8310] N85-27585
FUNCTIONS (MATHEMATICS)
Schubert varieties are arithmetically Cohen-Macaulay N85-27592
FUSION REACTORS
Ballooning beta limits of dee and bean shaped Tokamaks
[IPPJ-713] N85-27676
TOKASTAR: A Tokamak stellarator hybrid with possible bean-shaped operation
[IPPJ-718] N85-27680
Prospects for developing attractive magnetic fusion concepts
[DE85-006925] N85-27684
Fusion-power-core design of a Compact Reversed-Field Pinch Reactor (CRFPR)
[DE85-007710] N85-27692

G

GALACTIC COSMIC RAYS
Periodicity of variations in galactic cosmic ray fluxes and solar activity parameters near 20th cycle minimum N85-26791
Tables of nuclear cross sections for galactic cosmic rays: Absorption cross sections
[NASA-RP-1134] N85-27665
GALACTIC EVOLUTION
Dark matter, galaxies, and large scale structure in the universe
[DE85-008053] N85-27786
GALACTIC RADIATION
Results from the Helice galactic and solar cosmic ray experiment (E7) N85-27807
GALERKIN METHOD
Solution of Onsager's equation for a rotating compressible fluid in a multiply-connected domain
[DE85-007048] N85-27178
GALLIUM ARSENIDES
Dual species ion implantation of ternary compounds based on In-Ga-As
[AD-D011617] N85-27698
A study of Ga(.47)In(.53)As and Al(.48)In(.52)As for very high frequency device applications
[AD-A151995] N85-27706
Effect of dislocations on gallium arsenide FETs
[AD-A152249] N85-27709
TEM investigation of polar-on-nonpolar epitaxy: GaAs-AlGaAs on (100) Ge
[DE85-007613] N85-27714
GALLIUM COMPOUNDS
Ca-Ga, Sr-Ga and Ba-Ga binary systems
[DE85-006454] N85-26960
GARNETS
Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208
GAS ATOMIZATION
Rapid solidification of candidate ferritic steels
[DE85-006596] N85-26971
GAS BEARINGS
The series 2000: A miniature gas bearing DTG for low cost strapdown guidance and control N85-26848
GAS COMPOSITION
Equipment for monitoring low concentrations of volatile substances in gases or liquid metals
[BLL-DOUNREAY-TR-949-(9091.9F)] N85-27100
Comparison of observed and predicted short-term tracer-gas concentrations in the atmosphere
[DE85-007566] N85-27399

GAS DISCHARGE TUBES
Method of fabricating material for the electrodes of gas discharge devices
[DE85-007452] N85-27157
GAS DISCHARGES
Investigation of electron attachment and dissociation rates in C2F6/CH4 electric gas discharges
[AD-A151796] N85-27649
GAS DYNAMICS
Fluid and gas dynamics N85-26897
GAS EXPANSION
Study of stresses on surface of flat barrier immersed in under expanded jet of rarefied gas N85-27061
GAS FLOW
Aerodynamic forces developing in channels between vases in turbine drive wheels N85-27062
Hypersonic nonequilibrium gas flow past zero-aspect wing N85-27063
GAS JETS
Ion sensor signal fluctuations during operation of spacecraft reaction engines N85-26815
GAS LASERS
DARPA/TTO program IR binary optics
[AD-A152196] N85-27672
GAS PRESSURE
A feasibility study for using low boiling point fluids to change aircraft tire deflection
[AD-A152096] N85-26701
GAS TURBINE ENGINES
Analytical fuel property effects--small combustors
[NASA-CR-174738] N85-26709
Multiaxial and thermomechanical fatigue considerations in damage tolerant design
[NASA-TM-87022] N85-26964
GAS TURBINES
Study of the primary zone of gas turbine hearths
[ONERA-RTS-22/3256-EY] N85-26719
Transformation of nitrogen oxides while sampling combustion products
[AD-A152184] N85-26945
GAUGE INVARIANCE
Cocycles and magnetic monopole
[DE85-007797] N85-27612
Canonical analysis of the fermion sector in higher-derivative supergravity
[DE85-007826] N85-27635
GAUGE THEORY
Overview of the physics issues at the SSC
[DE85-007074] N85-27634
GEAR TEETH
Tooth wear in worm gears in vacuum N85-27070
GEARS
Tooth wear in worm gears in vacuum N85-27070
A description of the 64-meter antenna elevation drive gears and their strange wear N85-27107
An analytical investigation of dynamic coupling in nonlinear, geared rotor systems N85-27218
Life and reliability modeling of bevel gear reductions
[NASA-TM-87006] N85-27227
Fatigue life analysis of a turboprop reduction gearbox
[NASA-TM-87014] N85-27228
GENETIC ENGINEERING
Genetic engineering of plants: Agricultural research opportunities and policy concerns
[DE85-006771] N85-27513
GEODESY
Application of space methods in geodesy N85-26817
Radial orbit error spectrum for Topex N85-27292
Astrometric method advances Astronomy, geodesy N85-27306
Reports on cartography and geodesy. Series 1: Original reports, no. 94
[ISSN-0469-4236] N85-27357
Use of vector processors in cartographic raster data processing, with special regard to the AP-120B vector processor N85-27358
Standards and specifications for geodetic control networks
[PB85-166478] N85-27374
GEODETIC ACCURACY
Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and photomaps N85-26829
GEODETIC COORDINATES
UTM (Universal Transverse Mercator) determinations from geographical data
[AD-A152293] N85-27610
GEODETIC SURVEYS
Application of the Siemans Computer Aided Computer (Sicad) system to the surveying management in Baden-Wuerttemberg N85-27361
GEODYNAMICS
Basic research for the geodynamics program
[NASA-CR-175751] N85-27424
GEOIDS
Altimetry data and the elastic stress tensor of subduction zones
[NASA-CR-175796] N85-27425
GEOLOGY
Organizing geological work tasks for 1985 outlined N85-27303
GEOMAGNETIC HOLLOW
Altimetry data and the elastic stress tensor of subduction zones
[NASA-CR-175796] N85-27425
GEOMAGNETIC PULSATIONS
Correlated fluctuations of charged particle fluxes and magnetic field according to data from Intercosmos-10 satellite N85-26802
GEOMAGNETISM
Geophysical responses of dynamics of solar wind transition region N85-26795
Solar-Geophysical Data Number 484, December 1984. Part 1 (prompt reports): Data for November 1984, October 1984 and late data
[NASA-CR-175829] N85-27819
GEOMETRIC RECTIFICATION (IMAGERY)
Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and photomaps N85-26829
GEOMETRY
Optimum geometry of interblade passages in impellers of thermomolecular vacuum pump N85-27058
Scattering center analysis for radar cross section modification N85-27085
GEOPHYSICS
Tenth Conference of Working Group of Socialist Countries on Remote Sensing of Earth under Intercosmos Program N85-26820
USSR report: Earth sciences
[JPRS-UES-85-005] N85-27307
Surface exploration geophysics applied to the Moon
[DE85-006714] N85-27793
Solar-Geophysical Data Number 484, December 1984. Part 1 (prompt reports): Data for November 1984, October 1984 and late data
[NASA-CR-175829] N85-27819
Solar-Geophysical Data Number 484, December 1984. Part 2 (comprehensive reports): Data for June 1984, January 1982 and Miscellanea
[NASA-CR-175826] N85-27820
GEOPOTENTIAL
Satellite physical and orbital characteristics N85-27287
Radial orbit error spectrum for Topex N85-27292
The selection of the starting field: General versus tailored model N85-27294
GEOSYNCHRONOUS ORBITS
Station for in-orbit testing of satellites
[MBB-UR-708/84-O] N85-27733
GEOTHERMAL ENERGY UTILIZATION
Selection of promising sites for magma energy experiments
[DE85-006832] N85-27393
GERMANIUM
TEM investigation of polar-on-nonpolar epitaxy: GaAs-AlGaAs on (100) Ge
[DE85-007613] N85-27714
GERMANIUM ALLOYS
LPCVD tungsten deposition on Si-Ge alloy
[DE85-005588] N85-26970
GERT
SINOGRAFO: A system for influencing and forecasting weather
[INPE-3349-PRE/628] N85-27475
GIMBALS
Impact of magnetic isolation on pointing system performance in the presence of structural flexibility
[NASA-CR-172481] N85-26861
A Gimbal sizing analysis for an IPACS rotating assembly
[NASA-CR-172524] N85-26913
GLASS
Impact of optical inhomogeneity in sintered interface between glasses on laser emission characteristics N85-27053
Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208
Mechanical properties of lunar materials under anhydrous, hard vacuum conditions: Applications of lunar glass structural components
[DE85-006682] N85-27271
Accuracy of the calculated stress field around a craze
[DE85-005520] N85-27272
Dendritic growth from amorphous matrix
[DE85-007630] N85-27712
GLIDERS
Parachute extraction device for ultralight gliders
[CH-643499-A5] N85-26863
GLIDING
The study of thermal forecasting for gliding N85-27453
GLOBAL ATMOSPHERIC RESEARCH PROGRAM
Comparison of circulation statistics based on FGGE (First GARP Global Experiment) level 3-B analyses produced by GFDL (Geophysics Fluid Dynamics Laboratory) and ECMWF (European Centre for Medium Range Weather Forecasts) for special observing periods
[PB85-153948] N85-27492
GLOBAL POSITIONING SYSTEM
A replenishment phase study for the NAVSTAR global positioning system
[AD-A152030] N85-26695
Analysis of orbit transfer vehicles for GPS Block 3 satellites
[AD-A152021] N85-26860
Maintenance of time and frequency in the DSN using the global positioning system N85-27105
GLYCOLS
Ionization energies of liquids from energy distribution, quantum yield and second derivative curves
[AD-A152210] N85-26946
GOLD ALLOYS
Pulsed electrodeposition
[DE85-007057] N85-26950
GOVERNMENT PROCUREMENT
Navy program manager's guide, 1985 edition
[AD-A151925] N85-27744
Automation of the reporting and tracking requirements of architect-engineering type contracts
[AD-A152218] N85-27745
GRAIN BOUNDARIES
Tilt grain boundaries in NiO
[DE85-006839] N85-26978
GRAPH THEORY
Generalized graph coloring: A frequency assignment method for VHF broadcasting
[TUM-M8405] N85-27535
GRAPHITE
Graphite fiber intercalation: Dynamics of the bromine intercalation process
[NASA-TM-87015] N85-26921
NASA/aircraft industry standard specification for graphite fiber toughened thermoset resin composite material
[NASA-RP-1142] N85-26923
Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26928
Environmental stability of intercalated graphite fibers
[NASA-TM-87025] N85-26992
GRAPHITE-EPOXY COMPOSITES
Effect of low-velocity or ballistic impact damage on the strength of thin composite and aluminum shear panels
[NASA-TP-2441] N85-26924
Measurement of damping of graphite expoxy materials
[NASA-CR-175793] N85-26925
Temperature: Curvature relationships for unsymmetric graphite-epoxy laminates
[VPI-E-85-08] N85-26926
Directional thermal conductivities of graphite-epoxy composites: 0/90 and 0/+ or - 45/90
[AD-A152209] N85-26929
GRAPHITE-POLYIMIDE COMPOSITES
Effect of counterface material type and its topography on the tribological properties of polyimide composites
[NASA-TM-87036] N85-26993
GRAPHITIZATION
Directional thermal conductivities of graphite-epoxy composites: 0/90 and 0/+ or - 45/90
[AD-A152209] N85-26929
GRAPHS (CHARTS)
Graphic simulation of a machine-repairman model
[AD-A151761] N85-26633
Reliability models for dataflow computer systems
[NASA-CR-175813] N85-27543
GRATINGS (SPECTRA)
Mirror accessory for line straightening in diffraction spectrometers N85-27054
New image deblurring method described N85-27305
GRAVIMETRY
Standards and specifications for geodetic control networks
[PB85-166478] N85-27374
GRAVITATIONAL COLLAPSE
Inflation from extra dimensions
[DE85-007834] N85-27787
GRAVITATIONAL EFFECTS
Effects of posture and water immersion on diaphragmatic function N85-27515
GRAVITATIONAL FIELDS
Heliocentric sail problem with variable gravity field reduction N85-26816
On gravitational waves N85-27026

Topex Gravity Model Development Team activities during fiscal year 1984
[NASA-TM-86208] N85-27285
Status of the observational data sets — TOPEX N85-27286
Satellite selection criteria N85-27288
Optical best arc RMS test results N85-27290
The size of a gravitational field model for Topex N85-27293
The selection of the starting field: General versus tailored model N85-27294
Comparison of gravity field solution techniques N85-27295

GRAVITATIONAL WAVES
The Record of Electrical and Communication Engineering Conversazione, volume 53, no. 2, November 1984
[ISSN-0385-7719] N85-27022
On gravitational waves N85-27026

GRAVITY WAVES
Wave propagation in density stratified fluids N85-27162
Turbopause as source of internal gravity waves N85-27314
Wave dynamics and transport in the stratosphere
[NASA-CR-175789] N85-27413
Symposium on Atmospheric Sciences in South Africa
[CSIR-S-331] N85-27442
Atmospherically forced, coastally trapped, long period gravity waves off the south coast of southern Africa N85-27461

GREAT LAKES (NORTH AMERICA)
Great Lakes winter weather and ice conditions for 1982-83
[PB85-165009] N85-27498

GREENHOUSE EFFECT
Greenhouse effect in Earth's primordial atmosphere N85-27310

GREENLAND
Operational experiences with the ARGOS system in Greenland N85-27353
AWS (Air Weather Service) climatic briefs: North America
[AD-A152161] N85-27483

GRIDS
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172

GRINDING MACHINES
Non-contact hydrostatic bearings N85-27046

GROOVES
An X-ray study of residual stresses in narrow groove TIG weldments
[DE85-006485] N85-27274

GROUND BASED CONTROL
Helios ground operations N85-27811

GROUND EFFECT (COMMUNICATIONS)
A short range, high accuracy radar ranging system
[AD-A152195] N85-27122

GROUND STATIONS
Consultative Committee for Space Data Systems. Panel 1: Support
[NASA-CR-175786] N85-27090
The Telecommunications and Data Acquisition Report
[NASA-CR-175842] N85-27094
A description of the 64-meter antenna elevation drive gears and their strange wear N85-27107
Repair of the DSS-14 pedestal concrete N85-27108

GROUND TRACKS
Distributed control of circuits in multiuser communication networks with circuit precedence and path suitability criteria using failsafe routing concepts
[AD-A151825] N85-27113

GROUND TRUTH
Simultaneous Earth observations from 2 satellites
[NASA-TM-86204] N85-27325

GROUND WATER
Report on regional groundwater flow modeling for the Palo Duro Basin, Texas
[DE85-007490] N85-27370
Groundwater model for an island aquifer: Bribie Island groundwater study
[CE-44] N85-27398

GROUND WIND
Air flow of the western coastal boundary of South Africa and its influence on the ocean N85-27459

GROUP THEORY
Cocycles and magnetic monopole
[DE85-007797] N85-27612
Probabilistic algorithms in group theory
[AD-A152253] N85-27630

GUIDANCE (MOTION)
A cost-efficient control procedure for the benefit of all airspace users N85-26851

GUIDANCE SENSORS
Gyrolaser guidance system for medium range missiles N85-26649
The impact of VLSI on guidance and control system design N85-26654

GUINEA PIGS
Measurement of cochlear acoustic pressure in guinea pigs
[ISL-CO-234/83] N85-27644

GUN PROPELLANTS
Fiber reinforcement of gun propellant
[AD-A152296] N85-27014

GUNFIRE
Measurements of two-phase exhaust flow parameters of a small caliber gun associated with muzzle flash phenomena
[ISL-CO-212/83] N85-27182

GUST ALLEVIATORS
OLGA: An open loop gust alleviation N85-26744

GUSTS
Synthesis study: Validation of a gust generator in the presence of a model in a wind tunnel
[ONERA-RT-16/5108-RY-051] N85-26678

GUY WIRES
Dynamic and aeroelastic action of guy cables
[VTT-18] N85-27276

GYROSCOPES
Preguidance and piloting with the aid of composite inertial sensors N85-26646
The series 2000: A miniature gas bearing DTG for low cost strapdown guidance and control N85-26648
Low cost two gimbal inertial platform and its system integration N85-26661
Positions of relative equilibrium of satellite-gyrostat N85-26777
USSR report: Engineering and equipment
[JPRS-UEQ-84-006] N85-27035
Estimates of errors of a gyroscope stabilized platform N85-27050
Errors in compensating for image oscillation by means of a gyroscopic head N85-27051

GYROSTABILIZERS
Optimum parameters of aerogyroscopic satellite orientation system N85-26782

H

HALLEY'S COMET
TASS update on flights of Vega-1 and Vega-2 N85-26803
Kovtunenko discuses Vega Project N85-26804
French and West German equipment for Vega Project N85-26805

HAMILTONIAN FUNCTIONS
Eigenvalue approximation methods for quantum lattice Hamiltonians N85-27627

HAND (ANATOMY)
Investigation of the requirement for auxiliary heating of Canadian forces personnel
[AD-A151950] N85-27522

HANDBOOKS
AWS (Air Weather Service) climatic briefs: Asia
[AD-A151944] N85-27481

HARDENING (MATERIALS)
Determination of failure characteristics of materials and structures
[AD-A152073] N85-27266
On the accurate representation of large strain non-proportional plastic flow in ductile materials
[DE85-007106] N85-27273

HARDWARE
Active control technology: Past, present, future N85-26731
Flight Experiment Demonstration System (FEDS) functional description and interface document
[NASA-CR-175290] N85-26769
Multiple array processors for ocean acoustic problems
[AD-A152174] N85-27641

HARMONIC OSCILLATION
Errors in compensating for image oscillation by means of a gyroscopic head N85-27051
Approximate solution of the problem of fluid oscillations in cavities of revolution N85-27056
Study of oscillations of composite cylindrical shells using a dynamic stiffness technique N85-27066

HARMONICS
Internal resonance in nonlinear vibrating systems
[REPT-15/1984] N85-27245

HARNESSES
Torso restraint system
[AD-D011609] N85-26684
Improving inflight negative Gz restraint for aircrewmen
[AD-A151909] N85-26686

HARTREE APPROXIMATION
Microscopic analysis of angular momentum projected HFB-states in terms of interacting bosons
[DE85-007629] N85-27661

HASTELLOY (TRADEMARK)
Elevated temperature biaxial fatigue
[NASA-CR-175795] N85-27263

HAZARDS
Criteria for the classification of hydrographic positioning data
[AD-A152283] N85-26697
A review of safety practices and safety training for the explosives field
[AD-A152295] N85-27028
Hazards in welding due to oxygen changes in the workplace atmosphere
[BLL-WI-TRANSL-684-(9312.57)] N85-27224

HEALTH PHYSICS
The biological effects of radiofrequency radiation N85-27131
Review of epidemiological studies of human exposures to radiofrequency radiation N85-27134

HEAO 2
Optical pulsar in the Large Magellanic Cloud remnant 0540-69.3
[DE85-006707] N85-27788

HEAT EXCHANGERS
Equipment for monitoring low concentrations of volatile substances in gases or liquid metals
[BLL-DOUNREAY-TR-949-(9091.9F)] N85-27190

HEAT FLUX
Thermal and magnetic properties of neutron stars N85-27774

HEAT GENERATION
Two-d heat transfer through porous media with heat generation
[AD-A151965] N85-27173

HEAT PIPES
Sodium and lithium corrosion in molybedenum heat pipes
[DE85-005561] N85-27179

HEAT PUMPS
The use of heat pumps in district heat supply
[BLL-OA-TRANS-2728-(6196.3)] N85-27163

HEAT RESISTANT ALLOYS
Fatigue life extension N85-26864
Design overview of fiber-reinforced superalloy composites for the Space Shuttle main engine N85-26871
Materials for advanced rocket engine turbopump turbine blades N85-26872
Development of hydrogen resistant alloys N85-26873
Relationships between microstructure and microfissuring in alloy 718 N85-26876
Nonlinear structural analysis for fiber-reinforced superalloy turbine blades N85-26887
Iron rich low cost superalloys
[NASA-CR-174900] N85-26962

HEAT STORAGE
Central solar heating plants with seasonal storage. Evaluation of systems concepts based on heat storage in aquifers
[DE85-006788] N85-27396

HEAT TRANSFER
Advanced rocket engine cryogenic turbopump bearing thermal model N85-26879
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
The use of heat pumps in district heat supply
[BLL-OA-TRANS-2728-(6196.3)] N85-27163
Two-d heat transfer through porous media with heat generation
[AD-A151965] N85-27173
Component-specific modeling
[NASA-CR-174765] N85-27261
A computer analysis program for interfacing thermal and structural codes
[NASA-TM-87021] N85-27264
Fog advection in the Namib N85-27454
Adaptive grid generation for numerical solution of Burger's equation
[AD-A152217] N85-27606

HEAT TRANSFER COEFFICIENTS
Filmwise condensation of steam on low integral-finned tubes
[AD-A152220] N85-27176

HEAT TRANSMISSION
Determination of permissible heating rate of metal
[BLL-M-36107-(5828.4)] N85-26957

HEAT TREATMENT
Properties and microstructures for dual alloy combinations of three superalloys with alloy 901
[NASA-TM-86967] N85-26963

HEATING
A feasibility study for using low boiling point fluids to change aircraft tire deflection
[AD-A152096] N85-26701
Metal armatures for railguns
[AD-A152129] N85-26838
Microwave processing of lunar materials: Potential applications
[DE85-007223] N85-27003
Investigation of the requirement for auxiliary heating of Canadian forces personnel
[AD-A151950] N85-27522
Hydrogen recovery from extraterrestrial materials using microwave energy
[DE85-006717] N85-27789
HEATING EQUIPMENT
Investigation of the requirement for auxiliary heating of Canadian forces personnel
[AD-A151950] N85-27522
HEAVY IONS
Nuclear spectroscopic studies
[DE85-006894] N85-27652
Tables of nuclear cross sections for galactic cosmic rays: Absorption cross sections
[NASA-RP-1134] N85-27665
HELICOPTER DESIGN
Determination of quantitative relationships between selected critical helicopter design parameters
[AD-A152034] N85-26700
The evaluation of ACS for helicopters: Conceptual simulation studies to preliminary design N85-26737
Advanced flight simulation for helicopter development
[MBB-UD-416/84-O] N85-27731
HELICOPTERS
The use of a self-compensated magnetometer in an economical navigation system for the helicopter N85-26650
Finite-difference computations of rotor loads
[NASA-TM-86682] N85-26669
Rotor blade flap-lag stability and response in forward flight in turbulent flows N85-26696
Determination of quantitative relationships between selected critical helicopter design parameters
[AD-A152034] N85-26700
Development and flight test of a helicopter, X-band, portable precision landing system concept
[NASA-TM-86710] N85-26721
The evaluation of ACS for helicopters: Conceptual simulation studies to preliminary design N85-26737
ACT applied to helicopter flight control N85-26738
The evolution of active control technology systems for the 1990's helicopter N85-26758
The NAVTAG (Naval Tactical Game) system and its modification to include the SH-60B helicopter
[AD-A152004] N85-27624
HELIOS PROJECT
Ten years of Helios
[ISBN-3-88135-156-6] N85-27794
The Helios missions N85-27795
Zodiacal light: A replica of the interplanetary dust cloud — Helios space probe N85-27796
The micrometeorite experiment on Helios — inner solar system N85-27797
Results from the Helios galactic and solar cosmic ray experiment (E7) N85-27807
The significance of Helios for Europe N85-27808
Managerial benefits of Helios for the European industry N85-27809
The technological gains of Helios for the European industry N85-27810
Helios project support N85-27812
HELIOS 1
Ten years of Helios
[ISBN-3-88135-156-6] N85-27794
Ten years solar wind experiments on Helios 1 and Helios 2 N85-27798
Results of the magnetic field experiments E2 and E4 onboard Helios 1 and Helios 2 — magnetometer development N85-27799
Plasma waves in the solar wind: Ten years of Helios observations N85-27801
The Helios radio astronomy experiment N85-27803
Remote sensing of the plasma with time delay measurements (coronal sounding) N85-27804
The Faraday rotation experiment — solar corona N85-27805
The fast individualists in the solar system: Cosmic rays N85-27806
Helios ground operations N85-27811
HELIOS 2
Ten years of Helios
[ISBN-3-88135-156-6] N85-27794
Ten years solar wind experiments on Helios 1 and Helios 2 N85-27798
Results of the magnetic field experiments E2 and E4 onboard Helios 1 and Helios 2 — magnetometer development N85-27799
Plasma waves in the solar wind: Ten years of Helios observations N85-27801
Evidence concerning the generation mechanism of solar type 3 radio bursts N85-27802
The Helios radio astronomy experiment N85-27803
Remote sensing of the plasma with time delay measurements (coronal sounding) N85-27804
The Faraday rotation experiment — solar corona N85-27805
The fast individualists in the solar system: Cosmic rays N85-27806
Helios ground operations N85-27811
HELIOSTATS
The 10 MWe solar thermal central receiver pilot plant: Beam safety tests and analyses
[SAND-83-8035] N85-27379
HELMET MOUNTED DISPLAYS
Trends shaping advanced aircrew training capabilities through the 1990s
[AD-A152277] N85-27530
HEMATOLOGY
Research opportunities in loss of red blood cell mass in space flight
[NASA-CR-175808] N85-27517
HETEROGENEITY
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
HETEROJUNCTIONS
Polycrystalline semiconductor heterojunction modelling (CdS/CuInSe(sub)2)
[DE85-002913] N85-27713
HEURISTIC METHODS
Generation of flight paths using heuristic search
[AD-A151949] N85-26694
A heuristic solution to the spacing problem: Maximizing the minimum Euclidean distance among N points in a convex region
[AD-A152116] N85-27603
HF LASERS
Short Wavelength Chemical Laser (SWCL) Workshop
[AD-A151959] N85-27211
HIERARCHIES
Multigrid algorithms on the hypercube multiprocessor
[AD-A152200] N85-27556
Application of hierarchical data structures to geographical information systems
[AD-A152169] N85-27753
HIGH ALTITUDE
Spectral characteristics of protons at low and high altitudes during geomagnetic storm of 29 July 1977 N85-26786
Technological experiments on high-altitude rockets N85-26818
HIGH ASPECT RATIO
Numerical simulation of transonic flutter of a high-aspect ratio transport wing N85-26630
HIGH ENERGY ELECTRONS
Measurements of fluxes of high-energy protons and electrons by 2 oppositely oriented spectrometers aboard Cosmos-368 artificial Earth satellite N85-26800
HIGH ENERGY INTERACTIONS
Overview of the physics issues at the SSC
[DE85-007074] N85-27634
HIGH ENERGY PROPELLANTS
Analysis of deflagration to detonation transition in high-energy solid propellants N85-27010
HIGH FREQUENCIES
Scattering center analysis for radar cross section modification N85-27085
HIGH LEVEL LANGUAGES
An abstract specification language for Markov reliability models
[NASA-TM-86423] N85-27616
HIGH PRESSURE
Material technology N85-26870
Ignition of metals in high pressure oxygen N85-26874
High-pressure hydrogen testing of single crystal superalloys for advanced rocket engine turbopump turbine blades N85-26875
Graphite fiber intercalation: Dynamics of the bromine intercalation process
[NASA-TM-87015] N85-26921
Fog advection in the Namib N85-27454
HIGH RESOLUTION
Scheme for atmospheric thermal sensing from satellites with enhanced vertical resolution N85-26823
HIGH STRENGTH ALLOYS
High-pressure hydrogen testing of single crystal superalloys for advanced rocket engine turbopump turbine blades N85-26875
HIGH TEMPERATURE
Studies on the processing methods for extraterrestrial materials
[NASA-CR-175778] N85-26768
Multiaxial and thermomechanical fatigue considerations in damage tolerant design
[NASA-TM-87022] N85-26964
Low dose irradiation creep of pure nickel
[DE85-006320] N85-26975
Method of investigating accumulations of damage to weld joints in the case of low-cycle creep
[BLL-CE-TRANS-8088-(9022.09)] N85-27219
HIGH TEMPERATURE GASES
Fluid and gas dynamics N85-26897
Experimental evaluation of an advanced Space Shuttle main engine hot-gas manifold design concept N85-26898
HIGH TEMPERATURE PLASMAS
Charge uncovering effects on flute instabilities in hot electron plasmas
[DE85-006957] N85-27686
HIGHLY MANEUVERABLE AIRCRAFT
Autofocus motion compensation for synthetic aperture radar and its compatibility with strapdown inertial navigation sensors on highly maneuverable aircraft
[AD-A151940] N85-26693
HILBERT SPACE
Characteristic functionals of stochastic wave processes
[REPT-14/1984] N85-27084
HISTOLOGY
Histological and compositional responses of bone to immobilization and other experimental conditions
[NASA-CR-175837] N85-27518
HISTORIES
A climatic data bank for Northern Hemisphere land areas, 1851-1980
[DE85-007863] N85-27486
HOLE GEOMETRY (MECHANICS)
An approximation to the problem of a pin-loaded hole in an orthothropic plate
[VTH-LR-386] N85-27278
HOLLOW CATHODES
High efficiency ionizer using a hollow cathode discharge plasma
[DE85-006690] N85-27693
HOLOGRAPHIC SPECTROSCOPY
Fourier transform infrared spectrophotometric analysis of resin mix stoichiometry, revision 1
[DE85-007272] N85-26951
HOLOGRAPHY
Holographic lens for optical correlator N85-27052
Holoswitch, phase 1
[AD-A152212] N85-27198
Digital image analysis of four-frame holographic plasma and neutral gas interferograms
[DE85-008397] N85-27200
Ultrafast holography using optical fibers
[ISL-CO-238/83] N85-27204
HOMING DEVICES
Preguidance and piloting with the aid of composite inertial sensors N85-26646
HOMOGENIZING
Optimum convection conditions for Czochralski growth of semiconductors
[INPE-3395-PRE/665] N85-27703
HORIZONTAL ORIENTATION
Experimentally determined distribution of stress around a horizontally loaded model pile in dense sand
[CE-43] N85-27239
HOT CORROSION
Effects of surface chemistry on hot corrosion life
[NASA-CR-174915] N85-26711
HOUSINGS
Housing flexibility effects on rotor stability N85-26896
HUMAN BEHAVIOR
Predictors of cold weather health behaviors
[AD-A151910] N85-27529
Shape with and without redundant colour as coding mechanism for simulated radar displays in a time-extended simple vigilance task
[AD-A151683] N85-27533
HUMAN BEINGS
The origin of brain potentials associated with selective visual attention
[AD-A152291] N85-27511
Evaluation of a field expedient technique for sweat sample collection
[AD-A151916] N85-27521
HUMAN FACTORS ENGINEERING
A comparison of pictorial and speech warning messages in the modern cockpit
[AD-A151917] N85-26706

The introduction of new cockpit technology: A human factors study
[NASA-TM-86659] N85-27528

Shape with and without redundant colour as coding mechanism for simulated radar displays in a time-extended simple vigilance task
[AD-A151663] N85-27533

Design of computer-related workstations in relation to job functions and productivity
[AD-A151938] N85-27534

Corrective-predictive systems
[BLL-M-36063-(5828.4)] N85-27573

Information presentation in power plant control rooms
[VTT-320] N85-27668

Optimizing computational efficiency and user convenience in plasma simulation codes
[DE85-007661] N85-27682

Utilization of an automated riveting system in aircraft construction
[MBB-UT-11/84-O] N85-27736

HURRICANES

Forecast of Atlantic seasonal hurricane activity for 1985 N85-27470

Hurricane Research Division, fiscal year 1984 programs, fiscal year 1985 projections N85-27491

HYBRID NAVIGATION SYSTEMS

Terrain following without use of forward looking sensors N85-26659

HYBRID PROPULSION

Hybrid propulsion technologies for urban bus transit
[PB85-157469] N85-27773

HYBRID STRUCTURES

INEL electric vehicle laboratory qualification: Transition test results and comparisons with JPL ETV1-2 data
[DE85-008006] N85-27772

HYDRAULIC EQUIPMENT

Application of the hydraulic system frequency response program to propellant feed systems
[AD-A151824] N85-26914

HYDROCARBON FUELS

Improved catalysts for liquid hydrocarbon fuels from syngas
[DE85-006569] N85-26947

HYDROCARBONS

The remote detection of polynuclear aromatic hydrocarbons using laser-induced fluorescence
[AD-A152294] N85-27013

HYDRODYNAMIC EQUATIONS

General continuous formulations of atmospheric energy laws N85-27448

HYDRODYNAMICS

Instability of solar wind near streamlined bodies N85-26794

Characteristic functionals of stochastic wave processes
[REPT-14/1984] N85-27084

Optimum convection conditions for Czochralski growth of semiconductors
[INPE-3395-PRE/665] N85-27703

HYDROFLUORIC ACID

Rotational energy transfer in highly vibrationally excited hydrogen fluoride and deuterium fluoride
[AD-A152003] N85-27650

HYDROGEN

Development of hydrogen resistant alloys N85-26873

Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935

Transitional metal activation and functionalization of C-H bonds
[DE85-006816] N85-26949

Study of the kinetics and thermodynamics of hydrogen in Pd-based alloys
[DE85-007341] N85-26969

Spin-polarized quantum systems
[DE85-006914] N85-27667

The structure of galactic HI in directions of low total column density
[NASA-CR-175709] N85-27785

An analysis of alternate hydrogen sources for lunar manufacture
[DE85-007234] N85-27792

HYDROGEN EMBRITTLEMENT

Hydrogen induced crack growth in Grade-12 Titanium
[BNL-NUREG-35598] N85-26976

HYDROGEN IONS

Hydrogen vibrational population distributions and negative ion generation in tandem high-density hydrogen discharges
[DE85-006764] N85-27657

Energy reflection coefficient for H+ ions at energies between 10 and 80 keV
[DE85-007547] N85-27662

HYDROGEN ISOTOPES

Hydrogen recovery from extraterrestrial materials using microwave energy
[DE85-006717] N85-27789

HYDROGEN OXYGEN ENGINES

Advanced High Pressure O2/H2 Technology
[NASA-CP-2372] N85-26862

Ceramics for advanced O2/H2 application N85-26868

HYDROGEN PRODUCTION

Solid state hydrogen pumping and storage material
[AD-D011610] N85-27011

Hydrogen recovery from extraterrestrial materials using microwave energy
[DE85-006717] N85-27789

HYDROGEN RECOMBINATIONS

Spin-polarized quantum systems
[DE85-006914] N85-27667

HYDROGEN-BASED ENERGY

Solid state hydrogen pumping and storage material
[AD-D011610] N85-27011

HYDROGRAPHY

Criteria for the classification of hydrographic positioning data
[AD-A152283] N85-26697

Status of computer aided mapping in hydrographic services N85-27366

HYDROLOGY

Organizing geological work tasks for 1985 outlined N85-27303

Present stage of utilization of the ARGOS system by the ORSTOM hydrological service for hydrometric data collection N85-27348

The ARGOS system in Brazil --- hydrology N85-27349

Report on regional groundwater flow modeling for the Palo Duro Basin, Texas
[DE85-007490] N85-27370

Ecology of Pamlico River, North Carolina: An estuarine profile
[PB85-155703] N85-27404

HYDROSTATIC PRESSURE

Effects of posture and water immersion on diaphragmatic function N85-27515

HYDROSTATICS

Non-contact hydrostatic bearings N85-27046

HYDROXYL RADICALS

The copper vapor laser N85-27417

Water vapor N85-27420

HYPERNUCLEI

A 1-2 GeV/c beam line for hypernuclear and kaon research
[DE85-007623] N85-27659

HYPERSONIC FLOW

Hypersonic nonequilibrium gas flow past zero-aspect wing N85-27063

I

ICE FORMATION

Ice multiplication in summertime cumulus clouds in the BEWMEX area N85-27445

ICE NUCLEI

Ice multiplication in summertime cumulus clouds in the BEWMEX area N85-27445

SCPP (Sierra Cooperative Pilot Project) data collection and analysis. Volume 1: Executive summary
[PB85-156065] N85-27494

IGNITION

Ignition of metals in high pressure oxygen N85-26874

Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935

Design of a Mobile Combustion Diagnostic Fixture (MCDF)
[AD-A151814] N85-26941

ILLINOIS

Current alternative energy research and development in Illinois
[PB85-163137] N85-27397

ILLUMINATING

Use of Goudrian model in studying laws of reflection in vegetation-soil system in optical range. 2: Influence of illumination conditions on spectral brightness coefficients N85-26827

IMAGE ANALYSIS

The impact of VLSI on guidance and control system design N85-26854

Digital image analysis of four-frame holographic plasma and neutral gas interferograms
[DE85-006397] N85-27200

IMAGE CORRELATORS

Holographic lens for optical correlator N85-27052

IMAGE MOTION COMPENSATION

Autofocus motion compensation for synthetic aperture radar and its compatibility with strapdown inertial navigation sensors on highly maneuverable aircraft
[AD-A151940] N85-26693

Errors in compensating for image oscillation by means of a gyroscopic head N85-27051

IMAGE PROCESSING

SVIT complex for analysis of space photography N85-26819

Contribution to space program reviewed N85-26834

Polarimetric image recorder
[AD-D011605] N85-27192

New image deblurring method described N85-27305

CNPq/INPE LANDSAT system: Report of activities from October 1, 1983 to September 30, 1984 --- Brazil
[E85-10097] N85-27318

Noise correction on LANDSAT images using a spline-like algorithm
[E85-10098] N85-27319

Study of the urban evolution of Brasilia with the use of LANDSAT data
[E85-10101] N85-27321

System of interpretation of remote sensing data when hydrocarbons are present, volume 2
[INPE-3067-TDL/162-VOL-2] N85-27326

Symbiosis between postgraduate training and research projects: A successful experience
[INPE-3216-PRE/569] N85-27330

Reports on cartography and geodesy. Series 1: Original reports, no. 94
[ISSN-0469-4236] N85-27357

Realization of cartographic tasks on the multiprocessor system EGPA --- image processing N85-27360

A concept for map updating using digital image processing methods N85-27364

Contour line generalization using digital image processing methods N85-27367

What does digital image processing perform in the production of orthophotomaps N85-27368

IMAGES

The development and implementation of an optical communications laboratory
[AD-A151682] N85-27111

IMAGING TECHNIQUES

Validation of the ERBE scanner scene identification methodology: Analysis with Nimbus-7 ERB data
[NASA-CR-172598] N85-27466

IMMOBILIZATION

Histological and compositional responses of bone to immobilization and other experimental conditions
[NASA-CR-175837] N85-27518

IMPACT STRENGTH

Effect of low-velocity or ballistic impact damage on the strength of thin composite and aluminum shear panels
[NASA-TP-2441] N85-26924

IMPACT TESTS

Hopkinson bar simulation using DYNA2D
[DE85-006766] N85-27275

IMPEDANCE

Measurement of damping of graphite epoxy materials
[NASA-CR-175793] N85-26925

IMPEDANCE MATCHING

Switching mixer
[AD-D011602] N85-27139

IMPLANTATION

Percutaneous connectors
[NASA-CR-175827] N85-27508

A communications link for an implantable electrode array
[AD-A152238] N85-27510

IMPULSES

The Record of Electrical and Communication Engineering Conversazione, volume 53, no. 2, November 1984
[ISSN-0385-7719] N85-27022

Proposal of a method for evaluating accuracy of estimated impulse response of a system N85-27024

IMPURITIES

Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26928

Sodium and lithium corrosion in molybdenum heat pipes
[DE85-005561] N85-27179

Periodic cluster simulation of a disordered impurity system
[INPE-3453-PRE/705] N85-27628

Shallow impurity cluster states in n-type semiconductors
[INPE-3495-PRE/732] N85-27699

Electronic density of states for the double donor system StP, As
[INPE-3447-PRE/700] N85-27700

On some physical impurity properties of doped-indirect gap semiconductors at low and intermediate concentrations
[INPE-3452-PRE/704] N85-27701
Density of impurity states associated to inversion layers
[INPE-3406-PRE/675] N85-27702
Atom location by electron channeling analysis
[DE85-007549] N85-27716
INCOHERENCE
New image deblurring method described N85-27305
INCOMPRESSIBLE FLOW
Turbulent flow of fluid near trailing edge of plate in stream at zero angle of attack N85-27057
INCONEL (TRADEMARK)
Fatigue life extension N85-26864
INDEPENDENT VARIABLES
Estimation of launch vehicle performance parameters
[AD-A151927] N85-26839
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology
[AD-A151956] N85-27548
INDEXES (DOCUMENTATION)
DoD manual for standard data elements, part 1
[AD-A152201] N85-27754
DoD manual for standard data elements, part 2
[AD-A152202] N85-27755
DoD manual for standard data elements, part 3
[AD-A152203] N85-27756
DoD manual for standard data elements, part 4
[AD-A152204] N85-27757
DoD manual for standard data elements, part 5
[AD-A152205] N85-27758
INDIUM
Effect of dislocations on gallium arsenide FETs
[AD-A152249] N85-27709
INDIUM ARSENIDES
A study of Ga(.47)In(.53)As and Al(.48)In(.52)As for very high frequency device applications
[AD-A151995] N85-27706
INDIUM COMPOUNDS
Dual species ion implantation of ternary compounds based on In-Ga-As
[AD-D011617] N85-27698
INDUCTION HEATING
Underwater pipeline: Welding by high frequency induction
[BLL-WI-TRANS-682-(9312.57)] N85-27221
INDUSTRIAL PLANTS
Updating model RPD-1.25 industrial robot N85-27043
New stage in robotics development N85-27045
Review of national emission standards for mercury
[PB85-153906] N85-27406
INERTIAL GUIDANCE
Gyrolaser guidance system for medium range missiles N85-26649
INERTIAL NAVIGATION
Combinatorial performance/cost analysis of an autonomous navigation system for aircraft N85-26640
Navigation: Accounting for copy N85-26641
Low cost two gimbal inertial platform and its system integration N85-26661
Observability in problem of correction of inertial navigation systems using additional information from artificial Earth satellite N85-26785
INERTIAL PLATFORMS
Low cost two gimbal inertial platform and its system integration N85-26661
INERTIAL REFERENCE SYSTEMS
Relating the planetary ephemerides and the radio reference frame N85-27095
INFILTRATION
Development of a new faster process for the fabrication of ceramic fiber-reinforced ceramic composites by chemical vapor infiltration
[DE85-007550] N85-27007
INFLUENCE COEFFICIENT
Development and application of a unified balancing approach with multiple constraints N85-26891
INFORMATION
National Telecommunications and Information Administration authorization
[GPO-38-660] N85-27766
INFORMATION DISSEMINATION
Span graphics display utilities handbook, first edition
[NASA-TM-86500] N85-27567
Scientific data bases on a VAX-11/780 running VMS
[DE85-007925] N85-27760
INFORMATION MANAGEMENT
White paper on new international satellite systems
[PB85-162501] N85-27127
Information presentation in power plant control rooms
[VTT-320] N85-27688
INFORMATION RETRIEVAL
Forward library searching of previously-quantitated peaks, using a scan list created from a quantitation list by a novel FORTRAN program for the INCOS data system
[PB85-165835] N85-27541
Retrieval performance in a full text journal article database N85-27747
Access path optimization for network database retrieval N85-27749
Design of an interface to an information retrieval network N85-27750
INFORMATION SYSTEMS
Historical perspectives on information transmission engineering N85-27023
Diagnostic system
[INPE-3350-PRE/659] N85-27519
Internation information networks for material properties: Revision 1
[DE85-007412] N85-27572
Compilation of abstracts of theses submitted by candidates for degrees
[AD-A151722] N85-27739
DoD manual for standard data elements, part 2
[AD-A152202] N85-27755
DoD manual for standard data elements, part 3
[AD-A152203] N85-27756
DoD manual for standard data elements, part 4
[AD-A152204] N85-27757
DoD manual for standard data elements, part 5
[AD-A152205] N85-27758
Energy data base: Subject thesaurus
[DE84-010568] N85-27761
INFORMATION THEORY
Internation information networks for material properties: Revision 1
[DE85-007412] N85-27572
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762
INFRARED DETECTORS
Simulation of solidification in a Bridgman cell
[NASA-CR-175838] N85-27705
INFRARED IMAGERY
INPE's line imaging camera: Preliminary results
[INPE-3476-PRE/719] N85-27194
Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones
[PB85-164994] N85-27499
INFRARED PHOTOGRAPHY
Infrared presensitization photography N85-27189
INFRARED RADIATION
Mechanism of formation of low temperatures in nighttime Venusian thermosphere N85-26807
Scheme for atmospheric thermal sensing from satellites with enhanced vertical resolution N85-26823
INFRARED SPECTRA
A measurement of the vibrational band strength for the upsilon sub 3 band of the HO2 radical
[NASA-CR-175858] N85-26936
Fourier transform infrared spectrophotometric analysis of resin mix stoichiometry, revision 1
[DE85-007272] N85-26951
INFRARED SPECTROSCOPY
Molecular spectroscopy from the Kuiper Airborne Observatory
[NASA-CR-175748] N85-27783
INHOMOGENEITY
Structural inhomogeneities in amorphous nickel-phosphorus alloy
[BLL-M-36103-(5828.4)] N85-26980
Impact of optical inhomogeneity in sintered interface between glasses on laser emission characteristics N85-27053
Optimum convection conditions for Czochralski growth of semiconductors
[INPE-3395-PRE/665] N85-27703
INITIATION
Evidence concerning the generation mechanism of solar type 3 radio bursts N85-27802
INITIATORS (EXPLOSIVES)
Generation of detonation waves of given spatial and temporal characteristics
[ISL-R-103/83] N85-27021
INKS
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26965
INLET FLOW
Aerodynamic detuning analysis of an unstalled supersonic turbofan cascade
[NASA-TM-87001] N85-26670
A numerical simulation of the NFAC (National Full-scale Aerodynamics Complex) open-return wind tunnel inlet flow
[NASA-TM-86724] N85-26672
Flow rate and pressure profiles for 1 to 4 axially alined orifice inlets
[NASA-TP-2460] N85-27165
INLET TEMPERATURE
Redistribution of the inlet temperature profile through the SSME fuel turbine N85-26901
INPUT
Multivariable statistical modelling and its application N85-27617
INSOLATION
Screening ceramic materials for intense radiant heat applications
[DE85-006989] N85-27006
INSTRUMENT COMPENSATION
The use of a self-compensated magnetometer in an economical navigation system for the helicopter N85-26850
INSTRUMENTS
Instrumentation technology overview N85-26903
INTEGERS
Techniques for computing the DFT using the residue Fermat number systems and VLSI N85-27097
INTEGRAL EQUATIONS
On the relation between upwind-differencing schemes of Godunov, Engquist-Osher and Roe
[NASA-CR-175805] N85-27583
INTEGRATED CIRCUITS
The impact of VLSI on guidance and control system design N85-26654
An integrated UNIX-based CAD system for the design and testing of custom VLSI chips N85-27102
System design of automated VLSI (Very Large Scale Integrated) test station and implementation of selected system aspects
[AD-A151961] N85-27147
Radiation hardening for VLSI applications
[DE85-005493] N85-27155
Bond test data acquisition and analysis system
[DE85-007021] N85-27158
The systematic integration of very large scale integrated circuit computer-aided design tools into a toolkit optimized for academic applications
[AD-A151813] N85-27538
INTELLIGENCE
Military journal on US intelligence satellites N85-26832
INTERACTIONAL AERODYNAMICS
An experimental and analytical study of the aerodynamic interference effects between two Sears-Haack bodies at Mach 2.7
[NASA-TM-85729] N85-26673
Flow around rotating and nonmoving circular cylinder near flat screen. Report 1: Aerodynamic forces in cylinder N85-27059
Study of stresses on surface of flat barrier immersed in under expanded jet of rarefied gas N85-27061
INTERACTIVE CONTROL
Further development of an Interactive Control Engineering Computer Analysis Package (ICECAP) for discrete and continuous systems
[AD-A151783] N85-27546
INTERCALATION
Graphite fiber intercalation: Dynamics of the bromine intercalation process
[NASA-TM-87015] N85-26921
Environmental stability of intercalated graphite fibers
[NASA-TM-87025] N85-26992
INTERFACES
Orbiter middeck/payload standard interfaces control document
[NASA-TM-87473] N85-26840
Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26928
Continued development and implementation of the Universal Network Interface Device (UNID) 2 in the Digital Engineering Laboratory Network (DELNET), volume 2
[AD-A151947] N85-27570
INTERFEROMETERS
Phase-lock fiber optic interferometer
[AD-D011603] N85-27191
INTERFEROMETRY
Digital image analysis of four-frame holographic plasma and neutral gas interferograms
[DE85-008397] N85-27200
INTERIOR BALLISTICS
Simulation of interior ballistics flows in a shock tube
[ISL-CO-222/83] N85-27183
INTERLAYERS
Graphite fiber intercalation: Dynamics of the bromine intercalation process
[NASA-TM-87015] N85-26921

INTERMOLECULAR FORCES
Simulation studies for surfaces and materials strength [NASA-CR-175766] N85-27262
INTERNAL WAVES
Wave propagation in density stratified fluids N85-27162
Internal waves in layers of Earth's upper mantle N85-27312
Turbopause as source of internal gravity waves N85-27314
INTERNATIONAL COOPERATION
Tass reports program for Salyut-7 fully completed N85-26773
East Europe report: Science and technology [JPRS-ESA-85-019] N85-27077
International cooperation in space exploration N85-27079
The relevance of remote sensing to Brazil [INPE-3421-PRE/686] N85-27332
Internation information networks for material properties: Revision 1 [DE85-007412] N85-27572
East-West cooperation in outer space [S-HRG-98-1064] N85-27767
INTERNATIONAL RELATIONS
East-West cooperation in outer space [S-HRG-98-1064] N85-27767
INTERNATIONAL SUN EARTH EXPLORER 1
On the use of a sunward-libration-point orbiting spacecraft as an IMF monitor for magnetospheric studies [NASA-CR-175809] N85-27426
INTERNATIONAL SUN EARTH EXPLORER 3
On the use of a sunward-libration-point orbiting spacecraft as an IMF monitor for magnetospheric studies [NASA-CR-175809] N85-27426
INTERPLANETARY DUST
French and West German equipment for Vega Project N85-26805
INTERPLANETARY FLIGHT
TASS update on flights of Vega-1 and Vega-2 N85-26803
Kovtunenko discuses Vega Project N85-26804
INTERPLANETARY MAGNETIC FIELDS
On the use of a sunward-libration-point orbiting spacecraft as an IMF monitor for magnetospheric studies [NASA-CR-175809] N85-27426
An interplanetary magnetic field ensemble at 1 AU [NASA-TM-86209] N85-27784
Results of the magnetic field experiments E2 and E4 onboard Helios 1 and Helios 2 — magnetometer development N85-27799
Rome/Goddard Space Flight Center (GSFC) magnetic field experiment: A summary of results — flux gate magnetometer N85-27800
INTERPLANETARY SPACE
The Helios radio astronomy experiment N85-27803
INTERPOLATION
An incremental multigrid strategy for the fluid dynamics equations [AD-A151953] N85-27172
An interpolation method with the possibility of first derivative correction [INPE-3352-PRE/631] N85-27590
Surface interpolation using weighted splines [INPE-3387-PRE/658] N85-27591
INTERSTELLAR GAS
The structure of galactic HI in directions of low total column density [NASA-CR-175709] N85-27785
INTERSTELLAR MATTER
The soft X-ray background as a supernova blast wave viewed from inside: Solar abundance models [NASA-CR-175767] N85-27813
INTRUSION
Device for preventing intrusion of a blade during vibration cutting of intermittent cutting with a lathe N85-27232
INVENTIONS
Equipment for monitoring low concentrations of volatile substances in gases or liquid metals [BLL-DOUNREAY-TR-949-(9091.9F)] N85-27190
INVENTORY CONTROLS
An application of Markov chains to the problem of migration in inventory systems [AD-A151954] N85-27618
INVERSIONS
Born inversion with a stratified reference velocity [AD-A149222] N85-27594
INVISCID FLOW
Numerical simulation of inviscid compressible flow through three-dimensional cascade N85-26619
The role of computational fluid dynamics in aeronautical engineering N85-26629
Theoretical investigation of three-dimensional shock wave turbulent boundary layer interactions. Part 3 [AD-A152251] N85-27177
On the relation between upwind-differencing schemes of Godunov, Engquist-Osher and Roe [NASA-CR-175805] N85-27583
IO
A modeling analysis program for the JPL table mountain io sodium cloud [NASA-CR-175851] N85-27468
IODINE COMPOUNDS
Environmental stability of intercalated graphite fibers [NASA-TM-87025] N85-26992
ION BEAMS
Survey of experimental and theoretical electron-impact ionization cross sections for transition metal ions in low stages of ionization [DE85-007605] N85-27658
Surface modification of solids [DE85-007543] N85-27715
ION CURRENTS
Ionic conduction and water diffusion in Li (BETA)-alumina [DE85-007548] N85-27005
ION DENSITY (CONCENTRATION)
Hydrogen vibrational population distributions and negative ion generation in tandem high-density hydrogen discharges [DE85-006764] N85-27657
ION DISTRIBUTION
Ion sensor signal fluctuations during operation of spacecraft reaction engines N85-26815
ION IMPLANTATION
Dual species ion implantation of ternary compounds based on In-Ga-As [AD-D011617] N85-27696
Surface modification of solids [DE85-007543] N85-27715
ION IRRADIATION
Secondary ion mass spectrometry studies of solids and surfaces [AD-A151744] N85-26939
Energy reflection coefficient for H+ ions at energies between 10 and 80 keV [DE85-007547] N85-27662
Surface modification of solids [DE85-007543] N85-27715
ION MOTION
Ion and polymer chain motion in a superionic sodium-poly(ethylene oxide) complex [AD-A152290] N85-27001
Velocity space diffusion of high energy ions induced by a lower hybrid wave in a nonuniform magnetic field [IPPJ-714] N85-27681
ION PUMPS
Measurement of NSLS distributed diode sputter ion pump characteristics [DE85-06550] N85-27031
ION RECOMBINATION
Trends in the electric field enhancement of dielectronic recombination cross sections [DE85-006920] N85-27711
IONIC COLLISIONS
Nuclear spectroscopic studies [DE85-006894] N85-27652
IONIC MOBILITY
An investigation of tropospheric ions N85-27412
IONIZATION
Survey of experimental and theoretical electron-impact ionization cross sections for transition metal ions in low stages of ionization [DE85-007605] N85-27658
IONIZATION COEFFICIENTS
Ionization coefficient for atomic collisions in meteor trail N85-26792
IONIZATION CROSS SECTIONS
Theory of electron-impact atomic ionization cross sections [AD-A151783] N85-27648
Investigation of electron attachment and dissociation rates in C2F6/CH4 electric gas discharges [AD-A151796] N85-27649
Survey of experimental and theoretical electron-impact ionization cross sections for transition metal ions in low stages of ionization [DE85-007605] N85-27658
IONIZATION POTENTIALS
Ionization energies of liquids from energy distribution, quantum yield and second derivative curves [AD-A152210] N85-26946
IONIZERS
High efficiency ionizer using a hollow cathode discharge plasma [DE85-006690] N85-27693
IONIZING RADIATION
Investigation of basic characteristics of laser heating in thermoluminescence and of laser-stimulated luminescence [AD-A152143] N85-27212
Study of the degradation of short-circuit current and the open-circuit tension of spatial solar cells as a function of the fluency of 1MeV electrons [INPE-3356-PRE/634] N85-27814
IONOSPHERE
Turbopause as source of internal gravity waves N85-27314
IONOSPHERIC DISTURBANCES
Experimental research on ionospheric disturbance caused by cumulative barium vapor injection N85-26787
Full shadow phenomenon in Earth's upper atmosphere N85-27316
Remote sensing of irregularities in the equatorial ionosphere using the radio scintillation technique N85-27317
IONOSPHERIC DRIFT
A study of the generation mechanisms of high latitude and equatorial F-region irregularities using DE-2 data [NASA-CR-175745] N85-27423
IONOSPHERIC ELECTRON DENSITY
Influence of tropical F region in ionosphere on propagation of short radio waves N85-26798
Full shadow phenomenon in Earth's upper atmosphere N85-27316
IONOSPHERIC PROPAGATION
Influence of tropical F region in ionosphere on propagation of short radio waves N85-26798
Results of simultaneous measurements of absorption and polarization of radio waves reflected from ionosphere N85-27313
IONOSPHERIC SOUNDING
Remote sensing of irregularities in the equatorial ionosphere using the radio scintillation technique N85-27317
IONOSPHERIC TEMPERATURE
Determining effective rate of plasma heating in outer equatorial ionosphere using data from ISIS-1 and ISIS-2 satellites N85-26797
IONS
Comparison of computational results of a few representative three-dimensional transonic potential flow analysis programs N85-26628
Velocity space diffusion of high energy ions induced by a lower hybrid wave in a nonuniform magnetic field [IPPJ-714] N85-27681
IRON
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5) [AD-A152281] N85-26967
IRON ALLOYS
Iron rich low cost superalloys [NASA-CR-174900] N85-26962
IRON CHLORIDES
Environmental stability of intercalated graphite fibers [NASA-TM-87025] N85-26992
IRRADIATION
Low dose irradiation creep of pure nickel [DE85-006320] N85-26975
IRREGULARITIES
A study of the generation mechanisms of high latitude and equatorial F-region irregularities using DE-2 data [NASA-CR-175745] N85-27423
ISLANDS
Groundwater model for an island aquifer: Bribie Island groundwater study [CE-44] N85-27398
ISOTHERMS
A survey of major east coast snowstorms, 1960-1983. Part 2. Summary of surface and upperlevel characteristics [NASA-TM-86195] N85-27471
ITERATION
A decomposition procedure for convex quadratic programs [AD-A151732] N85-27595
Nonlinear DSA difference schemes for radiative transfer applications [DE85-005729] N85-27611
ITERATIVE SOLUTION
Solving the minimal least squares problem subject to bounds on the variables [TRITA-NA-8215] N85-27580
Finite elements and the method of conjugate gradients on a concurrent processor [NASA-CR-175812] N85-27588

J

JAMMING
Digital RF delay line for ECM (electronic countermeasure) look-through
[AD-A152120] N85-27120
JET AIRCRAFT
A method for simulating 3-D aircraft flow fields with jet plume effects
[NASA-CR-175802] N85-26664
JET ENGINE FUELS
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe
[NASA-CR-174840] N85-27012
JET ENGINES
Alternatives for jet engine control
[NASA-CR-175831] N85-26713
Alternatives for jet engine control
[NASA-CR-175832] N85-26714
Alternatives for jet engine control
[NASA-CR-175833] N85-26715
JET FLOW
Preliminary wind tunnel study of the influence of a jet on the unsteady aerodynamics of a turbojet engine
[ONERA-RT-12/5115-RY-230-R-231G] N85-26679
Study of the coupling between average, coherent and turbulent fields in a circular excited free jet
[ISL-R-115/83] N85-27184
Computation model of turbulent free flow: Application to axisymmetric jets
[ISL-R-126/83] N85-27185
Contribution to the study of equivalent noise source identification in fast cold jets
[ISL-R-114/83] N85-27645
Analyses of orderly structures in jets and the relationship with emitted noise
[ISL-R-117/83] N85-27646
JET STREAMS (METEOROLOGY)
Great Lakes winter weather and ice conditions for 1982-83
[PB85-165009] N85-27498
JOINTS (JUNCTIONS)
Initial quality of advanced joining concepts
[AD-A152241] N85-27027
An improved torsional method for determining the fracture toughness of stiff materials and of adhesive joints
[AD-A152091] N85-27267
JUNCTION TRANSISTORS
Simulation of solidification in a Bridgman cell
[NASA-CR-175838] N85-27705
JUPITER (PLANET)
Direct evidence for solar wind control of Jupiter's hectometer-wavelength radio emission
[NASA-TM-86073] N85-27790
JUPITER ATMOSPHERE
Possible period of Jovian activity and possibility of seasons N85-26810
Monodeurated methane in the outer solar system. 2. Its detection on Uranus at 1.6 microns
[NASA-CR-175762] N85-27782

K

KALMAN FILTERS
Formulation and implementation of nonstationary adaptive estimation algorithm with applications to air-data reconstruction
[NASA-TM-86727] N85-26699
KANSAS
Modeling the backscattering and transmission properties of vegetation canopies
[E85-10099] N85-27320
KAONS
A 1-2 GeV/c beam line for hypernuclear and kaon research
[DE85-007623] N85-27659
KEVLAR (TRADEMARK)
Effect of low-velocity or ballistic impact damage on the strength of thin composite and aluminum shear panels
[NASA-TP-2441] N85-26924
KINEMATIC EQUATIONS
Kinematic rate control of simulated robot hand at or near wrist singularity
[NASA-TP-2440] N85-27575
KINEMATICS
Optimum rotation of solid body with 1 axis of symmetry N85-26781
Structural design and kinematic configuration of two-armed robots N85-27037
A general simulation program for robot manipulator arm dynamics
[AD-A152121] N85-27230
Nonlinear equations for dynamics of pretwisted beams undergoing small strains and large rotations
[NASA-TP-2470] N85-27258
On the accurate representation of large strain non-proportional plastic flow in ductile materials
[DE85-007106] N85-27273
KINETIC ENERGY
A method for the evaluation of the residual energy of a metallic fragment after perforation of a thin target
[ISL-R-113/83] N85-27233
KINETIC THEORY
Kinetic theory and simulation of multi-species plasmas in Tokamaks excited with ICRF microwaves
[DE85-008119] N85-27691
KINETICS
Study of the kinetics and thermodynamics of hydrogen in Pd-based alloys
[DE85-007341] N85-26969
KRYPTON
Optogalvanic measurement of even parity Rydberg levels in krypton gas
[AD-A152113] N85-26943
KRYPTON FLUORIDE LASERS
Design optimization of singlemain-amplifier KrF laser-fusion systems
[DE85-007680] N85-27215

L

LABORATORIES
Guide for the execution of reliability tests in the laboratory — aeronautical equipment N85-27237
LAGEOS (SATELLITE)
Comparison of gravity field solution techniques N85-27295
Station coordinates and Earth rotation parameters from Lageos laser ranging N85-27299
LAGRANGE MULTIPLIERS
The nonlinear analysis of thick composite plates using a cubic spline function
[AD-A152115] N85-27268
Solving the minimal least squares problem subject to bounds on the variables
[TRITA-NA-8215] N85-27580
LAKE ICE
Great Lakes winter weather and ice conditions for 1982-83
[PB85-165009] N85-27498
LAMINAR FLOW
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-3, 220/May-June
[ESA-TT-882] N85-26636
Low Reynolds number vehicles
[AGARD-AG-288] N85-26666
Thermodynamic evaluation of transonic compressor rotors using the finite volume approach
[NASA-CR-175811] N85-26712
Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935
The overall reaction concept in premixed, laminar, steady-state flames. 2: Initial temperatures and pressures
[AD-A152132] N85-26944
Boundary layer at moving cylinder surface N85-27064
Dynamic response of fluid transmission lines
[AD-A151926] N85-27171
LAMINATES
Temperature: Curvature relationships for unsymmetric graphite-epoxy laminates
[VPI-E-85-08] N85-26926
The effects of pin elasticity, clearance, and friction on the stresses in a pin-loaded orthotropic plate
[NASA-CR-175816] N85-26927
Durability of Aramid reinforced aluminum laminate (ARALL)
[VTH-LR-423] N85-26933
The effect of low sheet thicknesses on the fracture toughness of an Al alloy (7075-T6) — Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-425] N85-26984
The nonlinear analysis of thick composite plates using a cubic spline function N85-27252
The nonlinear analysis of thick composite plates using a cubic spline function
[AD-A152115] N85-27268
The application of BRILES rivets for mechanical jointing of Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-387] N85-27279
Mechanical jointing in Aramid fiber composites: An experimental study
[VTH-LR-371] N85-27280
LAND MANAGEMENT
Application of interactive graphic systems in land consolidation. Processing of planning maps N85-27363
Raster or vector processing. Experience with the application of programs for the construction of thematic maps with boundary design in the Lower Saxony (West Germany) Land Administration for ground research N85-27365
LAND MOBILE SATELLITE SERVICE
Spacecraft configuration study for second generation mobile satellite system
[NASA-CR-175774] N85-26849
LAND USE
Experience of the Institute of Space Research with the use of remote sensing in urban planning studies
[INPE-3159-PRE/533] N85-27770
LANDING AIDS
Development and flight test of a helicopter, X-band, portable precision landing system concept
[NASA-TM-86710] N85-26721
LANDING GEAR
Active control landing gear for ground loads alleviation N85-26749
LANDSAT SATELLITES
Study of the urban evolution of Brasilia with the use of LANDSAT data
[E85-10101] N85-27321
LANDSAT 4
CNPq/INPE LANDSAT system: Report of activities from October 1, 1983 to September 30, 1984 — Brazil
[E85-10097] N85-27318
LAP JOINTS
The application of BRILES rivets for mechanical jointing of Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-387] N85-27279
LARGE SCALE INTEGRATION
The impact of VLSI on guidance and control system design N85-26654
Bond test data acquisition and analysis system
[DE85-007021] N85-27158
LARGE SPACE STRUCTURES
Model reduction techniques applied to the control of large space structures
[AD-A151784] N85-26857
The effect of inaccuracies in structural models on the control of large space structures
[AD-A151784] N85-26858
LASER ANEMOMETERS
Feasibility study on Laser Doppler Anemometer (LDA) wind velocity measurements using pulsed visible laser light
[ISL-CO-224/83] N85-27489
An automatic traversing system for Laser Doppler Anemometer (LDA) applications to wind tunnels and to free jets
[ISL-CO-225/83] N85-27490
LASER APPLICATIONS
Academician Zuyev notes plans for lasers on spacecraft for atmospheric research N85-26775
Application of space methods in geodesy N85-26817
Impact of optical inhomogeneity in sintered interface between glasses on laser emission characteristics N85-27053
USSR report: Machine tools and metalworking equipment
[JPRS-UMM-84-010] N85-27071
Development, implementation of industrial lasers reviewed N85-27075
Uses of laser technology described N85-27080
The utilization of optical fibers in holography
[ISL-R-102/83] N85-27196
Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208
Two-dimensional beat wave acceleration simulation
[DE85-005961] N85-27214
The copper vapor laser N85-27417
Research and development of new instruments N85-27418
Feasibility study on Laser Doppler Anemometer (LDA) wind velocity measurements using pulsed visible laser light
[ISL-CO-224/83] N85-27489
LASER CAVITIES
Internal step-up type higher harmonic light generating device
[DE85-007026] N85-27213
LASER DOPPLER VELOCIMETERS
La Recherche Aerospatiale Bimonthly Bulletin, Number 1984-4, 221/July-August
[ESA-TT-884] N85-26637
The development of onboard laser velocimeter at the Saint Louis Institute (France) from 1976 to 1982
[ISL-NB-402/83] N85-27216

Conducting a wind sensing study
[NASA-CR-175782] N85-27465
An automatic traversing system for Laser Doppler Anemometer (LDA) applications to wind tunnels and to free jets
[ISL-CO-225/83] N85-27490
Formulation of a coherent light-sheet by means of a cylindrical-spherical optical system
[ISL-R-116/83] N85-27674

LASER FUSION
Design optimization of singlemain-amplifier KrF laser-fusion systems
[DE85-007680] N85-27215

LASER GUIDANCE
Optmizing the specifications for an air-surface laser system N85-26644

LASER GYROSCOPES
Laser gyroscope random walk determination using a fast filtering technique N85-26647
Gyrolaser guidance system for medium range missiles N85-26649
Autofocus motion compensation for synthetic aperture radar and its compatibility with strapdown inertial navigation sensors on highly maneuverable aircraft
[AD-A151940] N85-26693

LASER HEATING
Investigation of basic characteristics of laser heating in thermoluminescence and of laser-stimulated luminescence
[AD-A152143] N85-27212

LASER MATERIALS
Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208

LASER MODE LOCKING
A study of mode-locked argon ion-dye laser systems N85-27205

LASER OUTPUTS
LDA study of non-steady flame propagation in a constant volume duct
[DE85-007233] N85-26948
Population inversion in laser-initiated vacuum arcs
[AD-A151958] N85-27210

LASER PUMPING
Population inversion in laser-initiated vacuum arcs
[AD-A151958] N85-27210
Study on a prismatic dye vat — laser systems
[CERT-2/6124-04-RO] N85-27217
Experimental investigation of the pulsed photoacoustic effect produced on a solid surface
[AD-A152114] N85-27640

LASER RANGER/TRACKER
Station coordinates and Earth rotation parameters from Lageos laser ranging N85-27299

LASER SPECTROSCOPY
Computer modeling of vibrational energy levels of potential laser candidates (diatomic molecules)
[AD-A151765] N85-27209

LASER TARGETS
Autofocus motion compensation for synthetic aperture radar and its compatibility with strapdown inertial navigation sensors on highly maneuverable aircraft
[AD-A151940] N85-26693

LASERS
Internal step-up type higher harmonic light generating device
[DE85-007026] N85-27213
Lidar ER2 (ozone). Crystal characterization for harmonic conversion — laser systems
[CERT-2/6129-00] N85-27717

LATERAL STABILITY
Operational and developmental experience with the F/A-18A digital flight control system N85-26742

LATHES
Device for preventing intrusion of a blade during vibration cutting of intermittent cutting with a lathe N85-27232

LATTICES (MATHEMATICS)
Eigenvalue approximation methods for quantum lattice Hamiltonians N85-27627

LAUNCH VEHICLES
Estimation of launch vehicle performance parameters
[AD-A151927] N85-26839

LEAD COMPOUNDS
Effect of traffic and meteorology on air pollution N85-27452

LEAD POISONING
Effect of traffic and meteorology on air pollution N85-27452

LEAKAGE
Management of vacuum leak-detection processes, standards and calibration
[DE85-006705] N85-27202

LEAST SQUARES METHOD
Statistical regularization methods in problem of navigational determination of space vehicle orbits N85-26784
Solving the minimal least squares problem subject to bounds on the variables
[TRITA-NA-8215] N85-27580

LEAVES
Microwave model prediction and verifications for vegetated terrain
[E85-10102] N85-27322

LENS DESIGN
Holographic lens for optical correlator N85-27052

LENSES
Dall-Null tester for spaceborne applications
[AD-A151772] N85-27779

LIAPUNOV FUNCTIONS
Optimal open loop and nonlinear feedback control for remote orbital capture
[AD-A151967] N85-26859

LICHENS
Interactive effects of acid rain and gaseous air pollutants on natural terrestrial vegetation
[DE85-005255] N85-27401

LIE GROUPS
Cocycles and magnetic monopole
[DE85-007797] N85-27612

LIFE (DURABILITY)
Effects of surface chemistry on hot corrosion life
[NASA-CR-174915] N85-26711
Development of new materials for turbopump bearings N85-26877
Bearings working group N85-26878
Material for electrodes of pulsed and arc sources of light
[DE85-007453] N85-27156
Life and reliability modeling of bevel gear reductions
[NASA-TM-87006] N85-27227
Fatigue life analysis of a turboprop reduction gearbox
[NASA-TM-87014] N85-27228

LIFE CYCLE COSTS
Some aspects of how to design cost-effective flight control systems N85-26839

LIFE SCIENCES
China report: Science and Technology
[JPRS-CST-85-012] N85-27300

LIGHT (VISIBLE RADIATION)
Optically triggered transferred-electron device microwave burst and single pulse generators
[AD-D011614] N85-27141

LIGHT SOURCES
Formulation of a coherent light-sheet by means of a cylindrical-spherical optical system
[ISL-R-116/83] N85-27674

LIGHTNING
Lightning strikes on aircraft. The TRIP 82 experiment and 3-dimensional electromagnetic interferometry
[ONERA-RF-88/7154-PY] N85-26690

LIMITERS (FUSION REACTORS)
Coupled plasma-neutral transport model for the scrape-off region
[DE85-007559] N85-27695

LINE SPECTRA
A measurement of the vibrational band strength for the upsilon sub 3 band of the HO2 radical
[NASA-CR-175858] N85-26936
An atlas of pure water vapor spectra from 500 to 5000/cm, Volume 2
[AD-A151757] N85-26940
Mirror accessory for line straightening in diffraction spectrometers N85-27054
Radio observations of comet P/Crommelin
[INPE-3480-PRE/723] N85-27777

LINEAR ACCELERATORS
Generalization of the Child-Langmuir relation for 1-dimensional time-dependent diodes
[DE85-007386] N85-27152
Surveying and optical tooling technologies combined to align a skewed beamline at the LAMPF accelerator
[DE85-005902] N85-27664

LINEAR ARRAYS
Design and development of a linear Fresnel lens air-cooled photovoltaic module and a stand-alone photovoltaic collector array
[DE85-006654] N85-27391
The theoretical response of a vertical line array to wind-generated noise in shallow water
[AD-A151730] N85-27638

LINEAR EQUATIONS
Ductility equation for porous metals and its linearization
[BLL-M-36118-(5828.4)] N85-26958
Solving the minimal least squares problem subject to bounds on the variables
[TRITA-NA-8215] N85-27580

LINEAR PROGRAMMING
Proposal for an extended set of FORTRAN Basic Linear Algebra subprograms
[DE85-007241] N85-27562
A decomposition procedure for convex quadratic programs
[AD-A151732] N85-27595

LINEAR SYSTEMS
Complexity of dense linear system solution on a multiprocessor ring
[AD-A151970] N85-27598

LINEARITY
An evaluation of discretized conditional probability and linear regression threshold techniques in model output statistics forecasting of visibility over the north Atlantic Ocean
[AD-A151955] N85-27619
Distortion functions
[DE85-007511] N85-27655

LINGUISTICS
Symbiosis between postgraduate training and research projects: A successful experience
[INPE-3216-PRE/569] N85-27330

LIQUID CRYSTALS
Nematic liquid crystals for car dashboards
[BMFT-FB-T-84-298] N85-27718

LIQUID FUELS
Improved catalysts for liquid hydrocarbon fuels from syngas
[DE85-006569] N85-26947
Technical and economic analysis of liquid fuel production from microalgae
[DE85-002926] N85-27018

LIQUID METALS
Analysis of alkali liquid metal Rankine space power systems
[DE85-005089] N85-26917

LIQUID OXYGEN
Flow-induced vibration of the SSME LOX posts: Additional issues
[DE85-007339] N85-26916

LIQUID PROPELLANT ROCKET ENGINES
Materials for advanced rocket engine turbopump turbine blades N85-26872
Ignition/combustion processes N85-26909

LIQUID ROCKET PROPELLANTS
Ignition/combustion processes N85-26909
Application of the hydraulic system frequency response program to propellant feed systems
[AD-A151824] N85-26914

LIQUIDS
Wave propagation in density stratified fluids N85-27162

LISTS
Glossary of landscape and vegetation ecology for Alaska
[PB85-153831] N85-27372

LITHIUM
Sodium and lithium corrosion in molybedenum heat pipes
[DE85-005561] N85-27179

LITHIUM ALLOYS
Investigation of the pitting potential of rapidly solidified aluminum-lithium alloys
[VTH-LR-434] N85-26986

LITHIUM COMPOUNDS
Ionic conduction and water diffusion in Li (BETA)-alumina
[DE85-007548] N85-27005

LITHIUM SULFUR BATTERIES
Sixth DOE Electrochemical Contractor's Review. Extended abstracts
[DE84-013679] N85-27151

LITHOGRAPHY
DARPA/TTO program IR binary optics
[AD-A152196] N85-27672

LITHOLOGY
Report on regional groundwater flow modeling for the Palo Duro Basin, Texas
[DE85-007490] N85-27370

LITHOSPHERE
Altimetry data and the elastic stress tensor of subduction zones
[NASA-CR-175796] N85-27425

LOAD TESTS
An improved torsional method for determining the fracture toughness of stiff materials and of adhesive joints
[AD-A152091] N85-27267

LOADING MOMENTS
Consolidation theory with consideration of frame plasticity
[REPT-9/1984] N85-27240
Analysis of elastoplastic grids under conditions of variable loads
[REPT-16/1984] N85-27242

LOADS (FORCES)
Finite-difference computations of rotor loads
[NASA-TM-86682] N85-26869

Automatic flight control modes for the AFTI/F-111 mission adaptive wing aircraft N85-26756
Rotordynamics N85-26888
Effects of bearing deadbands on bearing loads and rotor stability N85-26889
Breakway friction and dynamic friction/wear measurements of various ceramic materials from 25 C (75 F) to 650 C (1200 F)
[NASA-CR-174803] N85-26994
Experimentally determined distribution of stress around a horizontally loaded model pile in dense sand
[CE-43] N85-27239
Adaptation of continuous beams and the method of optimizing the flexibility of their elastic supports. Theorem on maximal adaptation loading, supplement
[REPT-10/1984-SUPPL] N85-27241
Fatigue damage and small crack growth during biaxial loading N85-27247
Dynamic response of shells and plates subjected to variable magnitude traveling loads N85-27250
Monitoring of turbo-machines by shaft vibration measurement
[BLL-TRANS-7900-(9022.09)] N85-27255
Some advances in experimentation supporting development of viscoplastic constitutive models
[NASA-CR-174855] N85-27260

LOGISTICS
A preliminary analysis of C-12 aircraft usage by the Navy Air Logistics System
[AD-A151921] N85-26634
A Dictionary-Directory System (DDS) for the SPLICE system
[AD-A152223] N85-27759

LONG DURATION SPACE FLIGHT
Research on zero-gravity botany apparatus N85-26811
Construction and functioning of extended orbital systems N85-26814

LONG RANGE WEATHER FORECASTING
A weather service for agriculture N85-27450
An appraisal of the duration of the recent drought in northeast Brazil and a forecast for 1985
[INPE-3477-PRE/720] N85-27478

LONG TERM EFFECTS
The cumulative effects of long term exposure to low levels of radiofrequency radiation (RFR) N85-27132
Acid precipitation in North America: 1980, 1981 and 1982 annual data summaries from acid deposition system data base
[PB85-162477] N85-27410

LONG WAVE RADIATION
Year-to-year variability of components of Earth's radiation budget according to satellite measurement data N85-26821

LONGITUDINAL STABILITY
Static longitudinal stability and control characteristics of the Fokker F27 Friendship calculated by simple handbook methods
[VTH-LR-394] N85-26728

LORAN C
National Airspace System Plan: Facilities, equipment and associated development N85-26892

LORENTZ TRANSFORMATIONS
Comment on quantum effects on 4-dimensional space-time symmetries
[DE85-007760] N85-27722

LOSSES
Fuel and oxidizer turbine loss analysis N85-26900
Histological and compositional responses of bone to immobilization and other experimental conditions
[NASA-CR-175837] N85-27518

LOW ALTITUDE
Spectral characteristics of protons at low and high altitudes during geomagnetic storm of 29 July 1977 N85-26786

LOW COST
Navigation: Accounting for copy N85-26641
Iron rich low cost superalloys
[NASA-CR-174900] N85-26962

LOW FREQUENCIES
Evaluation of human exposures to low frequency fields N85-27135
Biological influences of low-frequency sinusoidal electromagnetic signals alone and superimposed on RF carrier waves
[PB85-161248] N85-27527

LOW GRAVITY MANUFACTURING
Microgravity: A new tool for basic and applied research in space
[EP-212] N85-26767
Technological experiments on high-altitude rockets N85-26818

LOW PRESSURE
Measurements in low pressure flow using an electronic beam detector — wind tunnel tests N85-26676
Experimental testing of cooling by low pressure adsorption in a zeolite
[DE85-007509] N85-26763

LOW REYNOLDS NUMBER
Low Reynolds number vehicles
[AGARD-AG-288] N85-26666

LOW SPEED
The use of pressure sensing taps on the aircraft wing as sensor for flight control systems N85-26660

LOW SPEED WIND TUNNELS
A numerical simulation of the NFAC (National Full-scale Aerodynamics Complex) open-return wind tunnel inlet flow
[NASA-TM-86724] N85-26672

LOW TEMPERATURE
Mechanism of formation of low temperatures in nighttime Venusian thermosphere N85-26807
Investigation of the requirement for auxiliary heating of Canadian forces personnel
[AD-A151950] N85-27522

LOW WEIGHT
Free-surface phenomena under low- and zero-gravity conditions
[NASA-CR-175835] N85-27168

LUMINAIRES
Radioluminescent lighting for rural Alaskan runway lighting and marking
[DE85-007022] N85-26764
Acceptability testing of radioluminescent lights for VFR-night air taxi operations
[DE85-007303] N85-26765
Material for electrodes of pulsed and arc sources of light
[DE85-007453] N85-27156

LUMINESCENCE
Glow of ionospheric F-layer in Line 630 nm determined from photographs taken aboard Salyut-6 orbital station: Interpretation of results N85-26799
Luminescence probe studies of ionomers. 2. Steady-state measurements from sulfonated polyethylene and teflon membranes
[AD-A152233] N85-27000

LUNAR BASES
In-situ rock melting applied to lunar base construction and for exploration drilling and coring on the moon
[DE85-006716] N85-26770

LUNAR EXPLORATION
In-situ rock melting applied to lunar base construction and for exploration drilling and coring on the moon
[DE85-006716] N85-26770
Surface exploration geophysics applied to the Moon
[DE85-006714] N85-27793

LUNAR ROCKS
Microwave processing of lunar materials: Potential applications
[DE85-007223] N85-27003
Mechanical properties of lunar materials under anhydrous, hard vacuum conditions: Applications of lunar glass structural components
[DE85-006682] N85-27271

LUNAR SHELTERS
In-situ rock melting applied to lunar base construction and for exploration drilling and coring on the moon
[DE85-006716] N85-26770

LUNAR SOIL
In-situ rock melting applied to lunar base construction and for exploration drilling and coring on the moon
[DE85-006716] N85-26770

LYMAN SPECTRA
Studies of hot B subdwarfs. Part 2: Energy distributions of three bright sdB/sdOB stars in the 950-5500 angstrom range
[NASA-CR-175854] N85-27775

M

MACH NUMBER
Measurements of the symmetric aerodynamic coefficients for flat faced cylinders in the angle of attack regime 0 to 90 deg for transonic and supersonic speeds
[FFA-TN-1984-04] N85-26675

MACHINE TOOLS
USSR report: Machine tools and metalworking equipment
[JPRS-UMM-84-010] N85-27071
Status, prospects of computer-aided design discussed N85-27073
New robotized, vertical broaching machine featured N85-27074
Guidelines for optimization of robotized machining cells N85-27076
East Europe report: Science and technology
[JPRS-ESA-85-019] N85-27077
Extreme evaluation of reliability indices for components of metallurgical equipment
[BLL-M-36070-(5828.4)] N85-27234

MAGELLANIC CLOUDS
Optical pulsar in the Large Magellanic Cloud remnant 0540-69.3
[DE85-006707] N85-27788

MAGMA
Selection of promising sites for magma energy experiments
[DE85-006832] N85-27393

MAGNESIUM ALLOYS
Special features of the one-sided automatic welding of structures of Al-Mg alloys N85-27222

MAGNETIC ANOMALIES
System of interpretation of remote sensing data when hydrocarbons are present, volume 2
[INPE-3087-TDL/162-VOL-2] N85-27326
X-ray intensification at balloon altitudes of the South Atlantic magnetic anomaly in association with geomagnetic activity
[INPE-3469-PRE/712] N85-27437

MAGNETIC COMPASSES
Impact of magnetic isolation on pointing system performance in the presence of structural flexibility
[NASA-CR-172481] N85-26861

MAGNETIC DIPOLES
Orientation and strength of Martian magnetic dipole N85-26808
Possible configuration of Martian magnetosphere N85-26809

MAGNETIC DISPERSION
Comments on the paper by F. Pegoraro, L. Sugiyama: Spatial diffusion of charged high-energy fusion products by shear Alfven perturbations
[INPE-3291-PRE/606] N85-27675
A method of solving the dispersion equation for electrostatic electron waves in magnetized plasma
[KGI-PREPRINT-071] N85-27697

MAGNETIC DISTURBANCES
Substorms in energetic radiation belt particles according to data from Meteor artificial Earth satellite N85-26788

MAGNETIC FIELD CONFIGURATIONS
TOKASTAR: A Tokamak stellarator hybrid with possible bean-shaped operation
[IPPJ-718] N85-27680
Inherent magnetic field error measurements in ELMO Bumpy Torus
[DE85-005855] N85-27685
Charge uncovering effects on flute instabilities in hot electron plasmas
[DE85-006957] N85-27686
Spherical torus, compact fusion at low field
[DE85-006983] N85-27689

MAGNETIC FIELDS
Evaluation of human exposures to low frequency fields N85-27135
Electric field and energy transfer by magnetopause reconnection
[INPE-3448-PRE/701] N85-27432
A multipole model of the observed cerebral cortex magnetic field
[AD-A152237] N85-27526
High energy particle acceleration by coherent electromagnetic waves propagating across the magnetic field
[IPPJ-717] N85-27679
Prospects for developing attractive magnetic fusion concepts
[DE85-006925] N85-27684
Thermal and magnetic properties of neutron stars N85-27774

MAGNETIC MONOPOLES
Cocycles and magnetic monopole
[DE85-007797] N85-27612

MAGNETIC PROPERTIES
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967
Paramagnetic form factors from itinerant electron theory
[DE85-005272] N85-26973
Effects of wear on structure-sensitive magnetic properties of ceramic ferrite in contact with magnetic tape
[NASA-TM-87007] N85-26991

MAGNETIC RECORDING
Operation of autotracking system in various video playback modes N85-27055

MAGNETIC SIGNATURES
Orientation and strength of Martian magnetic dipole N85-26808
Possible configuration of Martian magnetosphere N85-26809

MAGNETIC STORMS
Spectral characteristics of protons at low and high altitudes during geomagnetic storm of 29 July 1977 N85-26786
Correlated fluctuations of charged particle fluxes and magnetic field according to data from Intercosmos-10 satellite N85-26802
MAGNETIC SUSPENSION
Study on needs for a magnetic suspension system operating with a transonic wind tunnel [NASA-CR-3900] N85-26759
MAGNETIC TAPES
Effects of wear on structure-sensitive magnetic properties of ceramic ferrite in contact with magnetic tape [NASA-TM-87007] N85-26991
MAGNETIC VARIATIONS
Poloidal rotation of magnetic fluctuations in reversed field pinch plasma [IPPJ-715] N85-27677
MAGNETICALLY TRAPPED PARTICLES
Correlated fluctuations of charged particle fluxes and magnetic field according to data from Intercosmos-10 satellite N85-26802
MAGNETOHYDRODYNAMIC FLOW
An interplanetary magnetic field ensemble at 1 AU [NASA-TM-86209] N85-27784
MAGNETOHYDRODYNAMIC GENERATORS
Parametric study of potential early commercial power plants Task 3-A MHD cost analysis [NASA-CR-175839] N85-27377
MAGNETOHYDRODYNAMIC STABILITY
Ballooning beta limits of dee and bean shaped Tokamaks [IPPJ-713] N85-27676
Magnetohydrodynamic stability of spheromak plasma in toroidal flux conserver with rectangular cross section [IPPJ-716] N85-27678
MAGNETOHYDRODYNAMIC TURBULENCE
An interplanetary magnetic field ensemble at 1 AU [NASA-TM-86209] N85-27784
MAGNETOHYDRODYNAMIC WAVES
Comments on the paper by F. Pegoraro, L. Sugiyama: Spatial diffusion of charged high-energy fusion products by shear Alfven perturbations [INPE-3291-PRE/606] N85-27675
MAGNETOHYDRODYNAMICS
Asymptotic solutions of MHD equations with finite conductivity [REPT-12/1984] N85-27581
A four-field model for Tokamak plasma dynamics [DE85-007111] N85-27694
MAGNETOMETERS
The use of a self-compensated magnetometer in an economical navigation system for the helicopter N85-26650
A method of estimating aircraft attitude from fly by wire flight control system data N85-26653
On the use of a sunward-libration-point orbiting spacecraft as an IMF monitor for magnetospheric studies [NASA-CR-175809] N85-27426
Results of the magnetic field experiments E2 and E4 onboard Helios 1 and Helios 2 — magnetometer development N85-27799
Rome/Goddard Space Flight Center (GSFC) magnetic field experiment: A summary of results — flux gate magnetometer N85-27800
MAGNETOPAUSE
Bursts of relativistic electrons in magnetopause and in outer radiation belt N85-26801
MAGNETOSPHERE
Substorms in energetic radiation belt particles according to data from Meteor artificial Earth satellite N85-26788
Modeling plasma mantle of Earth's magnetosphere N85-26790
Orientation and strength of Martian magnetic dipole N85-26806
Possible configuration of Martian magnetosphere N85-26809
Electric field and energy transfer by magnetopause reconnection [INPE-3448-PRE/701] N85-27432
Solar activity monitoring satellite (SAMSAT): Impact on space environment services [PB85-165066] N85-27818
MAINTAINABILITY
Space Station Engineering and Technology Development [NASA-CR-175806] N85-26851
A framework for software development [AD-A152067] N85-27551
MAINTENANCE
Graphic simulation of a machine-repairman model [AD-A151761] N85-26633
Maintaining consistency and accommodating network repair in a self-regenerative distributed database management system (a discussion of the means and cost) N85-26656
Management aspects of software maintenance [AD-A152035] N85-27550
MALES
Comparative anaerobic power of males and females [AD-A151960] N85-27523
MAMMALS
A communications link for an implantable electrode array [AD-A152238] N85-27510
MAN MACHINE SYSTEMS
A description of the process of elaborating man-machine dialog in an aircraft equipped with cathode tubes: Roles and specifications of piloted simulation methods N85-26658
A comparison of pictorial and speech warning messages in the modern cockpit [AD-A151917] N85-26706
Fujian forges ahead in electronic production N85-27301
Automation of the reporting and tracking requirements of architect-engineering type contracts [AD-A152218] N85-27745
MANAGEMENT INFORMATION SYSTEMS
An analysis of data dictionaries and their role in information resource management [AD-A152134] N85-27121
Implementation and analysis of a microcomputer based relational database system [AD-A151770] N85-27536
Data dictionary design as a stepping-stone to DBMS (Data Base Management System) implementation in the Indonesian Army Data Collecting and Processing Service [AD-A152101] N85-27752
MANAGEMENT METHODS
Management aspects of software maintenance [AD-A152035] N85-27550
The significance of Helios for Europe N85-27808
Managerial benefits of Helios for the European industry N85-27809
Helios project support N85-27812
MANAGEMENT PLANNING
Manufacturing methods and technology CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) related efforts (FY 1980 - 1986) [AD-A151817] N85-27547
Personal computer aided decision analysis [AD-A151911] N85-27743
Navy program manager's guide, 1985 edition [AD-A151925] N85-27744
Management control systems and interdependencies: An empirical study [AD-A152280] N85-27746
MANAGEMENT SYSTEMS
National Airspace System Plan: Facilities, equipment and associated development N85-26692
Management control systems and interdependencies: An empirical study [AD-A152280] N85-27746
MANIFOLDS
Experimental evaluation of an advanced Space Shuttle main engine hot-gas manifold design concept N85-26898
Numerical analysis of flow non-uniformity in the hot gas manifold of the Space Shuttle main engine N85-26899
MANIPULATORS
Structural design and kinematic configuration of two-armed robots N85-27037
Experience of sheet stamping robotic complexes N85-27041
Automatic manipulators for forging rollers N85-27042
Updating model RPD-1.25 industrial robot N85-27043
Industrial robots and automatic manipulators for forging and pressing operations at Second International Exhibition N85-27044
Control of motion of manipulator robots on basis of first-order kinematic algorithms N85-27047
Guidelines for optimization of robotized machining cells N85-27076
A general simulation program for robot manipulator arm dynamics [AD-A152121] N85-27230
Kinematic rate control of simulated robot hand at or near wrist singularity [NASA-TP-2440] N85-27575
Positioning of a robotic manipulator through the use of visual feedback [AD-A151933] N85-27577
MANNED ORBITAL LABORATORIES
Identification and control of structures in space [NASA-CR-175790] N85-26850
MANNED SPACE FLIGHT
USSR report: Space [JPRS-USP-85-004] N85-26772
Tass reports program for Salyut-7 fully completed N85-26773
MANUALS
A strain gauge manual [AD-A151802] N85-27197
DoD manual for standard data elements, part 2 [AD-A152202] N85-27755
DoD manual for standard data elements, part 3 [AD-A152203] N85-27756
DoD manual for standard data elements, part 4 [AD-A152204] N85-27757
DoD manual for standard data elements, part 5 [AD-A152205] N85-27758
MANUFACTURING
Manufacturing and producibility technology N85-26865
USSR report: Engineering and equipment [JPRS-UEQ-84-006] N85-27035
Experience with introduction of Finish perforation of precision parts for optical instruments N85-27038
Calculating reliability and productivity of cold stamping robot complex as queuing system N85-27039
Estimates of errors of a gyroscope stabilized platform N85-27050
MANY BODY PROBLEM
Boson degrees of freedom in Fermion many-body systems [DE85-006997] N85-27660
Multi-particle quantum mechanics obeying fractional statistics [DE85-007830] N85-27723
MAPPING
Study and mapping of anthropogenic effect on environment in different regions of USSR on basis of space photographs N85-26824
Creating a Mobile Autonomous Robot Research System (MARRS) [AD-A151963] N85-27229
Acid precipitation in North America: 1980, 1981 and 1982 annual data summaries from acid deposition system data base [PB85-162477] N85-27410
Circulation statistics from January and July: Simulation with the NCAR (National Center for Atmospheric Research) community climate model (CCMOB) [PB85-165637] N85-27497
Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms [INPE-3359-PRE/637] N85-27545
MAPS
Testing of scanner-assisted revision of the topographic map 1:25,000 (TK 25) N85-27359
Circulation statistics from January and July: Simulation with the NCAR (National Center for Atmospheric Research) community climate model (CCMOB) [PB85-165637] N85-27497
UTM (Universal Transverse Mercator) determinations from geographical data [AD-A152293] N85-27610
MARINE BIOLOGY
MARMAP survey of the continental shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia (1977 - 1983). Atlas 1: Summary of operations [PB85-150985] N85-27506
MARINE ENVIRONMENTS
Monitoring of marine environment N85-27341
An evaluation of discretized conditional probability and linear regression threshold techniques in model output statistics forecasting of visibility over the north Atlantic Ocean [AD-A151955] N85-27619
MARINE RESOURCES
Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic N85-27355
MARINE TECHNOLOGY
A summary of the Naval Postgraduate School research program [AD-A151721] N85-27738
Recent Naval Postgraduate School publications [AD-A151723] N85-27740
MARKETING
Air quality benefit analysis for Los Angeles and San Francisco based on housing values and visibility [PB85-166049] N85-27409
MARKING
On the use of marker loads for fatigue crack growth measurements [FFA-TN-1984-52] N85-27277

MARKOV CHAINS
Sensitivity of conditions for lumping finite Markov chains
[AD-A152122] N85-27604
Sensitivity of the stationary distribution vector for an ergodic Markov chain
[DE85-006979] N85-27621
MARKOV PROCESSES
A Markov method for simulating non-Gaussian wind speed time series
[DE85-007131] N85-27485
Sensitivity of conditions for lumping finite Markov chains
[AD-A152122] N85-27604
An abstract specification language for Markov reliability models
[NASA-TM-86423] N85-27616
An application of Markov chains to the problem of migration in inventory systems
[AD-A151954] N85-27618
MARS (PLANET)
Orientation and strength of Martian magnetic dipole N85-26808
Possible configuration of Martian magnetosphere N85-26809
MASKING
Spatial and temporal visual masking and visibility
[AD-A151968] N85-27524
MASKS
DARPA/TTO program IR binary optics
[AD-A152196] N85-27672
MASS
Histological and compositional responses of bone to immobilization and other experimental conditions
[NASA-CR-175837] N85-27518
MASS RATIOS
Satellite physical and orbital characteristics N85-27287
MASS SPECTROMETERS
An investigation of tropospheric ions N85-27412
MASS SPECTROSCOPY
Secondary ion mass spectrometry studies of solids and surfaces
[AD-A151744] N85-26939
MASS TRANSFER
Dissolution of solid solutions in absence of internal mass transfer
[BLL-M-36092-(5828.4)] N85-26959
MATERIALS HANDLING
Technological experiments on high-altitude rockets N85-26818
MATERIALS RECOVERY
Microwave processing of lunar materials: Potential applications
[DE85-007223] N85-27003
MATHEMATICAL MODELS
The investigation of tethered satellite system dynamics
[NASA-CR-175855] N85-26854
The effect of inaccuracies in structural models on the control of large space structures
[AD-A151794] N85-26858
Evaluation of human exposures to low frequency fields N85-27135
Theoretical and experimental comparisons of nearfield electrogalvanic fields due to nonlinear polarization layers
[AD-A152085] N85-27149
Studies of structure and modeling in turbulent shear flows
[AD-A151807] N85-27170
Two-d heat transfer through porous media with heat generation
[AD-A151965] N85-27173
The development of a computational model for a two-dimensional turbulent flow. Part 1: Mathematical background --- solid fuel combustion
[VTH-LR-436-PT-1] N85-27188
Optimal modeling with a minimum of local distortion
[REPT-18/1984] N85-27243
Topex Gravity Model Development Team activities during fiscal year 1984
[NASA-TM-86208] N85-27285
Atmospheric density model N85-27297
Use of forest modeling to project acid rain effects
[DE85-006251] N85-27400
Fluid-dynamic model of a downburst
[UTIAS-271] N85-27441
General continuous formulations of atmospheric energy laws N85-27448
A modeling analysis program for the JPL table mountain lo sodium cloud
[NASA-CR-175851] N85-27468
Intercomparison of Radiation Codes in Climate Models (ICRCCM)
[DE85-007251] N85-27487
Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters
[INPE-3492-PRE/729] N85-27504
Sensitivity of conditions for lumping finite Markov chains
[AD-A152122] N85-27604
An application of Markov chains to the problem of migration in inventory systems
[AD-A151954] N85-27618
Sensitivity of the stationary distribution vector for an ergodic Markov chain
[DE85-006979] N85-27621
Refinements in the computation of collision probabilities
[DE85-006118] N85-27663
Kinetic theory and simulation of multi-species plasmas in Tokamaks excited with ICRF microwaves
[DE85-008119] N85-27691
Polycrystalline semiconductor heterojunction modelling (CdS/CuInSe(sub)2)
[DE85-002913] N85-27713
Inflation from extra dimensions
[DE85-007834] N85-27787
MATHEMATICAL PROGRAMMING
Mathematical programming in computer network design
[AD-A152275] N85-27558
H-sets, convex programming and constrained approximation
[TRITA-NA-8308] N85-27587
The essence of invexity
[CSIR-TWISK-321] N85-27626
MATRICES (MATHEMATICS)
Explicit construction of contractivity matrices
[TRITA-NA-8309] N85-27586
Finite elements and the method of conjugate gradients on a concurrent processor
[NASA-CR-175812] N85-27588
Formulas for updating the generalized inverse of a symmetric matrix perturbed by a symmetric rank 2 matrix composed of 2 nonsymmetric DYADS
[AD-A151736] N85-27629
Computing the singular value decomposition of a product of two matrices
[DE85-006977] N85-27631
MATRIX MATERIALS
Development of a new faster process for the fabrication of ceramic fiber-reinforced ceramic composites by chemical vapor infiltration
[DE85-007550] N85-27007
MAXIMUM LIKELIHOOD ESTIMATES
Validation of the ERBE scanner scene identification methodology: Analysis with Nimbus-7 ERB data
[NASA-CR-172596] N85-27466
Topics in time delay estimation
[AD-A152231] N85-27607
Multivariable statistical modelling and its application N85-27617
Local likelihood estimation
[DE85-007238] N85-27620
MEASURING INSTRUMENTS
Study of acceptance criteria for joint densities in bituminous airport pavements
[FAA-PM-85-5] N85-26761
Free-surface phenomena under low- and zero-gravity conditions
[NASA-CR-175835] N85-27168
A transduction path method of solid state sensor analysis and investigation
[AD-A152123] N85-27707
MECHANICAL DEVICES
Preliminary technology utilization assessment of the robotic fruit harvester
[NASA-CR-175834] N85-27532
MECHANICAL DRIVES
A description of the 64-meter antenna elevation drive gears and their strange wear N85-27107
AC powertrain for an electric vehicle, phase 2 and phase 3
[NASA-CR-175760] N85-27771
MECHANICAL ENGINEERING
Compilation of abstracts of theses submitted by candidates for degrees
[AD-A151722] N85-27739
MECHANICAL PROPERTIES
A Gimbal sizing analysis for an IPACS rotating assembly
[NASA-CR-172524] N85-26913
Pulsed electrodeposition
[DE85-007057] N85-26950
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967
MEDICAL ELECTRONICS
Bioengineering and rehabilitation: Windows of opportunity past, present and future
[NASA-EP-216] N85-27516
MEDICAL EQUIPMENT
Bioengineering and rehabilitation: Windows of opportunity past, present and future
[NASA-EP-216] N85-27516
MEDICAL SERVICES
Bioengineering and rehabilitation: Windows of opportunity past, present and future
[NASA-EP-216] N85-27516
MELTING
In-situ rock melting applied to lunar base construction and for exploration drilling and coring on the moon
[DE85-006716] N85-26770
MELTING POINTS
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe
[NASA-CR-174840] N85-27012
MEMBRANES
Luminescence probe studies of ionomers. 2. Steady-state measurements from sulfonated polyethylene and teflon membranes
[AD-A152233] N85-27000
MENTAL PERFORMANCE
Effects of dehydration or cold exposure and restricted fluid intake upon cognitive performance
[AD-A151973] N85-27525
MERCATOR PROJECTION
UTM (Universal Transverse Mercator) determinations from geographical data
[AD-A152293] N85-27610
MERCURY ION ENGINES
Analysis of orbit transfer vehicles for GPS Block 3 satellites
[AD-A152021] N85-26860
MESH
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172
MESOSCALE PHENOMENA
Influence of coherent mesoscale structures on satellite-based Doppler lidar wind measurements
[NASA-CR-175853] N85-27467
MARMAP survey of the continental shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia (1977 - 1983). Atlas 1: Summary of operations
[PB85-150985] N85-27506
MESOSPHERE
Wave dynamics and transport in the stratosphere
[NASA-CR-175789] N85-27413
METABOLISM
Research opportunities in loss of red blood cell mass in space flight
[NASA-CR-175808] N85-27517
METAL BONDING
Development of acceptance criteria for batches of silane primer for external tank thermal protection system bonding applications
[NASA-CR-175850] N85-26995
METAL COATINGS
Effects of surface chemistry on hot corrosion life
[NASA-CR-174915] N85-26711
Vacuum plasma coatings for turbine blades N85-26869
Solid state hydrogen pumping and storage material
[AD-D011610] N85-27011
METAL CUTTING
USSR report: Machine tools and metalworking equipment
[JPRS-UMM-84-010] N85-27071
New robotized, vertical broaching machine featured N85-27074
Development, implementation of industrial lasers reviewed N85-27075
METAL FATIGUE
On the use of marker loads for fatigue crack growth measurements
[FFA-TN-1984-52] N85-27277
METAL FILMS
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26965
METAL MATRIX COMPOSITES
Nonlinear structural analysis for fiber-reinforced superalloy turbine blades N85-26887
Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26928
METAL PARTICLES
Particulate and whisker toughened alumina composites
[DE85-005239] N85-26930

METAL PLATES
Ultrafast holography using optical fibers
[ISL-CO-238/83] N85-27204
METAL POWDER
Research on products obtained by powder metallurgy N85-27081
METAL SHEETS
Experience of sheet stamping robotic complexes N85-27041
METAL SURFACES
Material for protection of metal surfaces against corrosion by molten salts
[DE85-007714] N85-26968
Characteristics of polyacrylic acid-complexed zinc phosphate conversion films deposited on metal surfaces
[DE85-004057] N85-26974
METAL VAPOR LASERS
Measurement of elements in the stratosphere
[NASA-CR-175891] N85-27414
High efficiency transverse dc electron beams
[AD-A152038] N85-27651
METAL WORKING
Production of shaped parts of NITINOL alloys by solid-state sintering
[AD-A152069] N85-26966
Experience with introduction of Finish perforation of precision parts for optical instruments N85-27038
USSR report: Machine tools and metalworking equipment
[JPRS-UMM-84-010] N85-27071
New robotized, vertical broaching machine featured N85-27074
Development, implementation of industrial lasers reviewed N85-27075
METAL-METAL BONDING
Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26928
Solid state bonding of molybdenum and TZM
[BLL-T6439/BG/LRS/LRST751/85] N85-27220
METALLIC GLASSES
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967
METALLOGRAPHY
Properties and microstructures for dual alloy combinations of three superalloys with alloy 901
[NASA-TM-86987] N85-26963
Ca-Ga, Sr-Ga and Ba-Ga binary systems
[DE85-006454] N85-26980
Full statistical characteristics of microdeformation
[BLL-M-36076-(5828.4)] N85-27254
METALLURGY
Estimation of the depth of a spherical cap in an hydraulic drawing test for some simple conditions of loss of stability
[REPT-4/1984] N85-26956
Extreme evaluation of reliability indices for components of metallurgical equipment
[BLL-M-36070-(5828.4)] N85-27234
METALS
Ignition of metals in high pressure oxygen N85-26874
Ductility equation for porous metals and its linearization
[BLL-M-36118-(5828.4)] N85-26958
Electrical resistivity in amorphous metals: Consequences of phonon ineffectiveness in the diffraction model
[AD-A152130] N85-27150
METEOR TRAILS
Ionization coefficient for atomic collisions in meteor trail N85-26792
METEORITIC COMPOSITION
Ionization coefficient for atomic collisions in meteor trail N85-26792
METEOROLOGICAL CHARTS
Development of a graphic system: Example using the outline of synoptic charts
[INPE-3296-PRE/611] N85-27327
A graphic system for drawing synoptic maps by computer
[INPE-3215-PRE/568] N85-27474
SINOGRAFO: A system for influencing and forecasting weather
[INPE-3349-PRE/626] N85-27475
METEOROLOGICAL INSTRUMENTS
SCPP (Sierra Cooperative Pilot Project) Forecasting Support N85-27493
METEOROLOGICAL PARAMETERS
Meteorological factors in Earth-Satellite propagation
[NASA-CR-175764] N85-27089
EHF attenuation derived from emission temperatures in light rain
[AD-A151166] N85-27110
Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance N85-27344
Forecast of Atlantic seasonal hurricane activity for 1985 N85-27470
Summary of Meteorological Observations, Surface (SMOS), Dallas, Texas
[AD-A150599] N85-27480
Hurricane Research Division, fiscal year 1984 programs, fiscal year 1985 projections N85-27491
METEOROLOGICAL RADAR
The development and application of volume scan and cell tracking capabilities for the analysis of convective cloud systems N85-27451
The use of radar in determining precipitation processes in the BEWMEX area N85-27455
Conducting a wind sensing study
[NASA-CR-175782] N85-27465
METEOROLOGICAL SATELLITES
Recent failures of weather satellites
[S-HRG-98-1070] N85-26855
METEOROLOGICAL SERVICES
A weather service for agriculture N85-27450
METEOROLOGY
USSR report: Earth sciences
[JPRS-UES-85-005] N85-27307
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405
Study of the functions of similarity of the planetary boundary layer. Part 1: Theory
[INPE-3129-PRE/520-PT-1] N85-27428
Symposium on Atmospheric Sciences in South Africa
[CSIR-S-331] N85-27442
Hurricane Research Division, fiscal year 1984 programs, fiscal year 1985 projections N85-27491
Comparison of circulation statistics based on FGGE (First GARP Global Experiment) level 3-B analyses produced by GFDL (Geophysics Fluid Dynamics Laboratory) and ECMWF (European Centre for Medium Range Weather Forecasts) for special observing periods
[PB85-153948] N85-27492
Compilation of abstracts of theses submitted by candidates for degrees
[AD-A151722] N85-27739
METHANE
Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935
Low pressure storage of methane on interlayered clays for potential vehicular applications
[DE85-006949] N85-27017
Studies related to the deep Earth gas: 1983
[PB85-171114] N85-27373
Monodeurated methane in the outer solar system. 2. Its detection on Uranus at 1.6 microns
[NASA-CR-175762] N85-27782
METROLOGY
Measurement capabilities of the Bendix Metrology Organization
[DE85-005795] N85-27029
NBS physical measurement services
[NBSIR-84-2875] N85-27633
MICROCOMPUTERS
System design of automated VLSI (Very Large Scale Integrated) test station and implementation of selected system aspects
[AD-A151961] N85-27147
Design and construction of a computer controlled microthermocouple probe for the study of buoyant jets
[AD-A152224] N85-27199
China report: Science and Technology
[JPRS-CST-85-012] N85-27300
Implementation and analysis of a microcomputer based relational database system
[AD-A151770] N85-27536
Detailed design of an object oriented, multiprogramming, multitasking operating system for sixteen-bit microcomputers
[AD-A152086] N85-27552
Numerical optimization algorithm for engineering problems using microcomputer
[AD-A152135] N85-27554
Computer assisted flight schedule optimization
[AD-A151689] N85-27623
A portable pulse analyzer for nuclear geophysics using a Sinclair-TK microcomputer
[INPE-3278-PRE/601] N85-27666
Automation of the reporting and tracking requirements of architect-engineering type contracts
[AD-A152218] N85-27745
Design of an interface to an information retrieval network N85-27750
MICROCRACKS
Mechanical properties of high performance carbon fibers N85-26922
MICROELECTRONICS
East Europe report: Science and technology
[JPRS-ESA-85-019] N85-27077
Bond test data acquisition and analysis system
[DE85-007021] N85-27158
China report: Science and Technology
[JPRS-CST-85-012] N85-27300
NBS (National Bureau of Standards) research reports
[PB85-127421] N85-27764
MICROHARDNESS
Pulsed electrodeposition
[DE85-007057] N85-26950
MICROMETEORITES
The micrometeorite experiment on Helios — inner solar system N85-27797
MICROPROCESSORS
Optimal control of electric drive with simultaneous control inputs for motor current and flux N85-27049
Creating a Mobile Autonomous Robot Research System (MARRS)
[AD-A151963] N85-27229
MICROSEISMS
A seismic ARGOS data collection platform N85-27350
MICROSTRIP TRANSMISSION LINES
A study of computational techniques for noncanonical microstrip antennas and arrays
[AD-A152216] N85-27123
MICROSTRUCTURE
Relationships between microstructure and microfissuring in alloy 718 N85-26876
Microstructures and properties of rapidly solidified alloys
[NASA-CR-172377] N85-26961
Properties and microstructures for dual alloy combinations of three superalloys with alloy 901
[NASA-TM-86987] N85-26963
Hydrogen induced crack growth in Grade-12 Titanium
[BNL-NUREG-35598] N85-26976
Microwave processing of lunar materials: Potential applications
[DE85-007223] N85-27003
Multiple scattering of electromagnetic waves in discrete random media
[AD-A151766] N85-27112
Full statistical characteristics of microdeformation
[BLL-M-36076-(5828.4)] N85-27254
MICROWAVE EMISSION
Experiments in microwave exposure in the rat: Body temperature, serum chemistry and the use of chemical restraint
[PB85-156834] N85-27512
MICROWAVE EQUIPMENT
In situ microwave measurements of dielectric properties and moisture in materials
[DE85-003622] N85-26953
Microwave processing of lunar materials: Potential applications
[DE85-007223] N85-27003
Hardware test program for evaluation of baseline range-range rate sensor concept
[NASA-CR-175794] N85-27193
An inexpensive radar-responding relocation device for drifting oceanographic instruments
[AD-A152170] N85-27505
MICROWAVE SCATTERING
Modeling the backscattering and transmission properties of vegetation canopies
[E85-10099] N85-27320
Microwave model prediction and verifications for vegetated terrain
[E85-10102] N85-27322
MICROWAVE SENSORS
Ion sensor signal fluctuations during operation of spacecraft reaction engines N85-26815
MICROWAVES
Thermal consequences of localized SAR from RFR exposures N85-27130
The medical results of human exposures to radio frequency radiation N85-27133
Development and application of new radiofrequency radiation safety standards N85-27137
Active and passive remote sensing of ice
[AD-A151741] N85-27369
Hydrogen recovery from extraterrestrial materials using microwave energy
[DE85-006717] N85-27799
A synchrotron/inverse Compton interpretation of a solar burst producing fast pulses at lambda 3 mm and hard X-rays N85-27815
Microwaves and hard X-rays ultrafast time structures at the impulsive phase of solar bursts
[INPE-3478-PRE/721] N85-27816

MIGRATION
An application of Markov chains to the problem of migration in inventory systems
[AD-A151954] N85-27618
MILITARY AIRCRAFT
Generation of flight paths using heuristic search
[AD-A151949] N85-26694
MILITARY HELICOPTERS
Piloted simulation of one-on-one helicopter air combat at NOE flight levels
[NASA-TM-86686] N85-26720
MILITARY OPERATIONS
The evolution of active control technology systems for the 1990's helicopter N85-26758
US said to seek military advantage in space N85-26831
Military journal on US intelligence satellites N85-26832
Development of a persistent chemical agent simulation system
[NASA-CR-175780] N85-26937
The NAVTAG (Naval Tactical Game) system and its modification to include the SH-60B helicopter
[AD-A152004] N85-27624
A Dictionary-Directory System (DDS) for the SPLICE system
[AD-A152223] N85-27759
Soviet space programs, 1976-1980 (with supplementary data through 1983). Part 3: Unmanned space activities
[S-PRT-98-235-PT-3] N85-27765
MILITARY TECHNOLOGY
Personal computer aided decision analysis
[AD-A151911] N85-27743
MILKY WAY GALAXY
The structure of galactic HI in directions of low total column density
[NASA-CR-175709] N85-27785
MILLIMETER WAVES
EHF attenuation derived from emission temperatures in light rain
[AD-A151166] N85-27110
Calibration methods in millimeter-wave radioastronomy
[INPE-3481-PRE/724] N85-27778
MINE DETECTORS
The PINGUIN B3: A remotely piloted vehicle for mine identification and disposal
[MBB-UM-1/84-O] N85-27735
MINERAL EXPLORATION
Organizing geological work tasks for 1985 outlined N85-27303
MINERALS
Effects of temperature on remotely sensed mafic mineral absorption features N85-27323
Review of national emission standards for mercury
[PB85-153906] N85-27406
MINICOMPUTERS
Management considerations for an information center
[AD-A151774] N85-27742
MINIMAX TECHNIQUE
Topics in time delay estimation
[AD-A152231] N85-27607
MINING
An analysis of alternate hydrogen sources for lunar manufacture
[DE85-007234] N85-27792
MIRRORS
Mirror accessory for line straightening in diffraction spectrometers N85-27054
Software for reflectivity calculations of X-ray mirrors, revision 1
[DE85-006642] N85-27688
MISSILE CONTROL
Cost-effective missile guidance through distributed architecture and standard processes N85-26662
MISSILE DESIGN
Simulation: A tool for cost-effective systems design and live test reduction N85-26657
Cost-effective missile guidance through distributed architecture and standard processes N85-26662
MISSILE SILOS
Empirical development of ground acceleration, velocity and displacement for accidental explosions at J5 or the proposed large altitude rocket cell at Arnold Engineering Development Center
[DE85-006324] N85-27020
MISSILE SYSTEMS
Simulation: A tool for cost-effective systems design and live test reduction N85-26657
MISSILE TRAJECTORIES
Estimation of launch vehicle performance parameters
[AD-A151927] N85-26839
MISSILES
Gyrolaser guidance system for medium range missiles N85-26649
MISSION PLANNING
European space science horizon 2000
[ESA-SP-1070] N85-26771
A SLAM II simulation model for analyzing space station mission processing requirements
[NASA-CR-175664] N85-26853
Tethered nuclear power for the Space Station
[NASA-TM-87023] N85-26912
Component-specific modeling
[NASA-CR-174765] N85-27261
MIXERS
Switching mixer
[AD-D011602] N85-27139
MIXING
Evaluation of experimental epoxy monomers
[NASA-TM-87476] N85-26996
Holoswitch, phase 1
[AD-A152212] N85-27198
The seasonal cycle of atmospheric CO in the Southern Hemisphere N85-27447
Surface modification of solids
[DE85-007543] N85-27715
MIXING CIRCUITS
High-speed digital baseband mixer N85-27103
Switching mixer
[AD-D011602] N85-27139
MIXTURES
Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935
Equation of state and two-body correlations for fluids of non-spherical molecules
[AD-A151969] N85-27174
MODELS
Study of longitudinal landing flying qualities evaluation using pilot model theory
[AD-A152194] N85-26702
Metal armatures for railguns
[AD-A152129] N85-26838
Model reduction techniques applied to the control of large space structures
[AD-A151784] N85-26857
Liquid rocket combustor computer code development N85-26910
Laser Schlieren and ultraviolet diagnostics of rocket combustion N85-26911
Mechanical properties of high performance carbon fibers N85-26922
Optical best arc RMS test results N85-27290
The selection of the starting field: General versus tailored model N85-27294
A wind-bivane/microprocessor system for on-line prediction and display of pollutant distributions N85-27449
A multipole model of the observed cerebral cortex magnetic field
[AD-A152237] N85-27526
A general purpose scatter storage subsystem and a comparison of hashing methods
[NASA-CR-175814] N85-27542
Multivariable statistical modelling and its application N85-27617
MODES
Development and application of a unified balancing approach with multiple constraints N85-26891
MOISTURE
Bound and free moisture studies of solid materials by FTNMR
[DE85-003227] N85-26952
In situ microwave measurements of dielectric properties and moisture in materials
[DE85-003622] N85-26953
MOISTURE CONTENT
Luminescence probe studies of ionomers. 2. Steady-state measurements from sulfonated polyethylene and teflon membranes
[AD-A152233] N85-27000
MOLECULAR BEAM EPITAXY
A study of Ga(.47)In(.53)As and Al(.48)In(.52)As for very high frequency device applications
[AD-A151995] N85-27706
TEM investigation of polar-on-nonpolar epitaxy: GaAs-AlGaAs on (100) Ge
[DE85-007613] N85-27714
MOLECULAR COLLISIONS
Studies of collisional and nonlinear radiative process for development of coherent UV and XUV sources
[AD-A152001] N85-27670
MOLECULAR ENERGY LEVELS
Computer modeling of vibrational energy levels of potential laser candidates (diatomic molecules)
[AD-A151765] N85-27209
MOLECULAR EXCITATION
Transverse periodic boundary conditions in molecular dynamics with uniaxial strain shock waves
[DE85-006497] N85-27656
Studies of collisional and nonlinear radiative process for development of coherent UV and XUV sources
[AD-A152001] N85-27670
MOLECULAR IONS
Hydrogen vibrational population distributions and negative ion generation in tandem high-density hydrogen discharges
[DE85-006764] N85-27657
MOLECULAR OSCILLATIONS
Rotational energy transfer in highly vibrationally excited hydrogen fluoride and deuterium fluoride
[AD-A152003] N85-27650
MOLECULAR PUMPS
Optimum geometry of interblade passages in impellers of thermomolecular vacuum pump N85-27058
MOLECULAR RELAXATION
Quantum statistical theory of vibrational dynamics in a laser-driven admolecule-surface system
[AD-A152022] N85-27719
MOLECULAR ROTATION
Rotational energy transfer in highly vibrationally excited hydrogen fluoride and deuterium fluoride
[AD-A152003] N85-27650
MOLECULAR STRUCTURE
Equation of state and two-body correlations for fluids of non-spherical molecules
[AD-A151969] N85-27174
Periodic cluster simulation of a disordered impurity system
[INPE-3453-PRE/705] N85-27628
MOLECULAR WEIGHT
Formulation/cure technology for ultrahigh molecular weight silphenylene-siloxane polymers
[NASA-TP-2476] N85-26990
MOLTEN SALTS
Material for protection of metal surfaces against corrosion by molten salts
[DE85-007714] N85-26968
MOLYBDENUM
Sodium and lithium corrosion in molybedenum heat pipes
[DE85-005561] N85-27179
Solid state bonding of molybdenum and TZM
[BLL-T6439/BG/LRS/LRST751/85] N85-27220
MOLYBDENUM ALLOYS
Solution softening in molybdenum-rhenium alloys
[DE85-006706] N85-26972
MOMENT DISTRIBUTION
Experimentally determined distribution of stress around a horizontally loaded model pile in dense sand
[CE-43] N85-27239
MOMENTS
Stability of functionals determined by moment conditions
[TRITA-NA-8310] N85-27585
MONITORS
Signal analysis techniques for incipient failure detection in turbomachinery N85-26884
Reusable rocket engine turbopump condition monitoring N85-26907
Equipment for monitoring low concentrations of volatile substances in gases or liquid metals
[BLL-DOUNREAY-TR-949-(9091.9F)] N85-27190
MONKEYS
Histological and compositional responses of bone to immobilization and other experimental conditions
[NASA-CR-175837] N85-27518
MONOMERS
Evaluation of experimental epoxy monomers
[NASA-TM-87476] N85-26996
MONOPULSE RADAR
Ziv-Zakai bound applied to an amplitude-comparison monopulse radar
[AD-A151937] N85-27118
MONTE CARLO METHOD
Multiple scattering of electromagnetic waves in discrete random media
[AD-A151786] N85-27112
A mathematical model for calculating detection probability of a diffusion target
[AD-A152026] N85-27601
An overview of stochastic signal modeling
[AD-A152144] N85-27605
The statistical analysis of initial imperfection measurements — shell profiles
[VTH-LR-442] N85-27622
Energy reflection coefficient for H+ ions at energies between 10 and 80 keV
[DE85-007547] N85-27662
LIGHT: A ray tracing code to simulate light collection in scintillation spectrometers and light pipes
[DE85-007213] N85-27673
MOON
Neutrino measurements on the Moon
[DE85-007700] N85-27791

An analysis of alternate hydrogen sources for lunar manufacture
[DE85-007234] N85-27792
Surface exploration geophysics applied to the Moon
[DE85-006714] N85-27793
MORPHOLOGY
Percutaneous connectors
[NASA-CR-175627] N85-27508
MOVING TARGET INDICATORS
Interference suppressor for radar MTI
[AD-D011606] N85-27086
MULTIPATH TRANSMISSION
Distributed control of circuits in multiuser communication networks with circuit precedence and path suitability criteria using failsafe routing concepts
[AD-A151825] N85-27113
Development of a modified time delay spectrometry technique for underwater acoustic measurements in a multipath environment
[AD-A152111] N85-27639
MULTIPLEXING
Wavelength multiplexer-demultiplexer
[AD-D011608] N85-27140
MULTIPOLES
A multipole model of the observed cerebral cortex magnetic field
[AD-A152237] N85-27526
MULTIPROCESSING (COMPUTERS)
A modular dissimilar redundant computer designed for high integrity control N85-26751
Reports on cartography and geodesy. Series 1: Original reports, no. 94
[ISSN-0469-4236] N85-27357
Realization of cartographic tasks on the multiprocessor system EGPA — image processing N85-27360
Multigrid algorithms on the hypercube multiprocessor
[AD-A152200] N85-27556
Parallel computation of multiple-scale problems
[DE85-007230] N85-27563
Local uniform mesh refinement on loosely-coupled parallel processors
[AD-A152199] N85-27571
Complexity of dense linear system solution on a multiprocessor ring
[AD-A151970] N85-27598
Multiple array processors for ocean acoustic problems
[AD-A152174] N85-27641
MULTIPROGRAMMING
Detailed design of an object oriented, multiprogramming, multitasking operating system for sixteen-bit microcomputers
[AD-A152086] N85-27552
MULTISPECTRAL BAND CAMERAS
The Bresex multispectral camera: Preliminary characteristics
[INPE-3424-PRE/687] N85-27195
MULTISPECTRAL BAND SCANNERS
Modular Optoelectronic Multispectral Scanner (MOMS) for Earth observation. First results of STS-7 mission
[MBB-UR-717/83-O] N85-27732
MULTIVARIATE STATISTICAL ANALYSIS
The statistical analysis of initial imperfection measurements — shell profiles
[VTH-LR-442] N85-27622

N

NAP-OF-THE-EARTH NAVIGATION
Piloted simulation of one-on-one helicopter air combat at NOE flight levels
[NASA-TM-86686] N85-26720
NARROWBAND
Survey of narrow band vocoder technology
[AD-A151919] N85-27114
NASA PROGRAMS
Activities of the Aeronautics and Space Engineering Board
[NASA-CR-175825] N85-26610
Spacestation: The next logical step
[NASA-EP-213] N85-26847
Bioengineering and rehabilitation: Windows of opportunity past, present and future
[NASA-EP-216] N85-27516
Department of Housing and Urban Development-independent agencies appropriations for 1986. Part 6: National Aeronautics and Space Administration
[GPO-47-235] N85-27768
NATIONAL AIRSPACE SYSTEM
National Airspace System Plan: Facilities, equipment and associated development N85-26692
NATURAL GAS
Low pressure storage of methane on interlayered clays for potential vehicular applications
[DE85-006949] N85-27017
NATURAL LANGUAGE (COMPUTERS)
Research in knowledge representation for natural language understanding
[AD-A152260] N85-27579
NAVIER-STOKES EQUATION
Numerical analyses in aerodynamic design of aero-engine fan N85-26618
Navier-Stokes solution of hypersonic blunt-nosed body flowfields N85-26624
Recent progress in computational aerodynamics N85-26626
LU methods for the compressible Navier-Stokes equations N85-27160
Theoretical investigation of three-dimensional shock wave turbulent boundary layer interactions. Part 3
[AD-A152251] N85-27177
NAVIGATION
A cost-efficient control procedure for the benefit of all airspace users N85-26651
NAVIGATION AIDS
Combinatorial performance/cost analysis of an autonomous navigation system for aircraft N85-26640
Preguidance and piloting with the aid of composite inertial sensors N85-26646
The use of a self-compensated magnetometer in an economical navigation system for the helicopter N85-26650
A method of estimating aircraft attitude from fly by wire flight control system data N85-26653
Terrain following without use of forward looking sensors N85-26659
Low cost two gimbal inertial platform and its system integration N85-26661
Navigation and flight director guidance for the NASA/FAA helicopter MLS curved approach flight test program
[NASA-CR-177350] N85-26691
Observability in problem of correction of inertial navigation systems using additional information from artificial Earth satellite N85-26785
NAVIGATION INSTRUMENTS
Navigation and flight director guidance for the NASA/FAA helicopter MLS curved approach flight test program
[NASA-CR-177350] N85-26691
NAVIGATION SATELLITES
A replenishment phase study for the NAVSTAR global positioning system
[AD-A152030] N85-26695
Observability in problem of correction of inertial navigation systems using additional information from artificial Earth satellite N85-26785
Analysis of orbit transfer vehicles for GPS Block 3 satellites
[AD-A152021] N85-26860
NAVY
A preliminary analysis of C-12 aircraft usage by the Navy Air Logistics System
[AD-A151921] N85-26634
Recent Naval Postgraduate School publications
[AD-A151723] N85-27740
Navy program manager's guide, 1985 edition
[AD-A151925] N85-27744
NEAR FIELDS
Theoretical and experimental comparisons of nearfield electrogalvanic fields due to nonlinear polarization layers
[AD-A152085] N85-27149
NEAR INFRARED RADIATION
INPE's line imaging camera: Preliminary results
[INPE-3476-PRE/719] N85-27194
NEAR WAKES
Experimental investigations of prismatic cylinders in flow with harmonic pulsations
[KU-SFB-210/E/4] N85-27186
NEODYMIUM LASERS
Conducting a wind sensing study
[NASA-CR-175782] N85-27485
NEPTUNE ATMOSPHERE
Possible period of Jovian activity and possibility of seasons N85-26810
NETWORK CONTROL
Distributed control of circuits in multiuser communication networks with circuit precedence and path suitability criteria using failsafe routing concepts
[AD-A151825] N85-27113
NETWORK SYNTHESIS
Corrective-predictive systems
[BLL-M-36063-(5828.4)] N85-27573
NEUTRAL ATOMS
Secondary ion mass spectrometry studies of solids and surfaces
[AD-A151744] N85-26939
NEUTRAL GASES
Digital image analysis of four-frame holographic plasma and neutral gas interferograms
[DE85-006397] N85-27200
The structure of galactic HI in directions of low total column density
[NASA-CR-175709] N85-27785
NEUTRAL PARTICLES
Cometary atmospheres: Modeling the spatial distribution of observed neutral radicals
[NASA-CR-175852] N85-27781
NEUTRINOS
Neutrino measurements on the Moon
[DE85-007700] N85-27791
NEUTRON EMISSION
Refinements in the computation of collision probabilities
[DE85-006118] N85-27663
NEUTRON SCATTERING
Paramagnetic form factors from itinerant electron theory
[DE85-005272] N85-26973
Discrete foundation for physics and experience
[DE85-008172] N85-27720
NEUTRON STARS
Thermal and magnetic properties of neutron stars N85-27774
NEUTRONS
Nonlinear DSA difference schemes for radiative transfer applications
[DE85-005729] N85-27611
NEVADA
Preliminary assessment of climatic change during late Wisconsin time, southwest Great Basin and vicinity, Arizona, California and Nevada
[DE85-008343] N85-27488
NEWTON THEORY
Finite axisymmetric deformation of a thin shell of revolution N85-27251
NEWTON-RAPHSON METHOD
A numerical procedure on three-dimensional parabolic flow in duct N85-26620
NICKEL
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967
Low dose irradiation creep of pure nickel
[DE85-006320] N85-26975
NICKEL ALLOYS
Fatigue life extension N85-26864
Ignition of metals in high pressure oxygen N85-26874
Relationships between microstructure and microfissuring in alloy 718 N85-26876
Structural inhomogeneities in amorphous nickel-phosphorus alloy
[BLL-M-36103-(5828.4)] N85-26960
NICKEL CADMIUM BATTERIES
Proposed energy systems for the Brazilian data collection satellite
[INPE-3393-PRE/664] N85-26856
Investigation of pseudo bi-polar nickel cadmium batteries as filter elements for pulsed power loads
[AD-A152112] N85-27369
NICKEL OXIDES
Tilt grain boundaries in NiO
[DE85-006839] N85-26978
NIGHT
Mechanism of formation of low temperatures in nighttime Venusian thermosphere N85-26807
NIMBUS 7 SATELLITE
Validation of the ERBE scanner scene identification methodology: Analysis with Nimbus-7 ERB data
[NASA-CR-172596] N85-27486
NIOBIUM
Positron annihilation studies of vacancy formation in tungsten, chromium, and niobium
[DE85-006837] N85-27710
NITINOL ALLOYS
Production of shaped parts of NITINOL alloys by solid-state sintering
[AD-A152089] N85-26966
NITRAMINE PROPELLANTS
Analysis of deflagration to detonation transition in high-energy solid propellants N85-27010
NITROGEN
A comprehensive strategy for saturation decompression with nitrogen-oxygen
[AD-A151800] N85-27520
NITROGEN DIOXIDE
Research and development of new instruments N85-27418
NITROGEN OXIDES
Transformation of nitrogen oxides while sampling combustion products
[AD-A152184] N85-26945
NOAA 6 SATELLITE
Location and data collection satellite system ARGOS. User's guide — satellite based localization N85-27371

NOAA 7 SATELLITE
Availability of the ARGOS system based on the orbital characteristics of the TIROS-N satellites — oceanographic/meteorological data N85-27352
Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic N85-27355
Location and data collection satellite system ARGOS. User's guide — satellite based localization N85-27371

NOAA 8 SATELLITE
Availability of the ARGOS system based on the orbital characteristics of the TIROS-N satellites — oceanographic/meteorological data N85-27352
Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic N85-27355

NOISE (SOUND)
Vortex studies relating to boundary layer turbulence and noise
[NASA-TM-87475] N85-27169
The theoretical response of a vertical line array to wind-generated noise in shallow water
[AD-A151730] N85-27638

NOISE MEASUREMENT
Contribution to the study of equivalent noise source identification in fast cold jets
[ISL-R-114/83] N85-27645
Analyses of orderly structures in jets and the relationship with emitted noise
[ISL-R-117/83] N85-27646
Prediction of free-field noise levels from aircraft flyover measurements
[VTH-LR-427] N85-27647

NOISE PREDICTION (AIRCRAFT)
Prediction of free-field noise levels from aircraft flyover measurements
[VTH-LR-427] N85-27647

NOISE PROPAGATION
Interaction of finite-amplitude sound with air-filled porous materials
[NASA-CR-174885] N85-27637

NOISE REDUCTION
Interaction of finite-amplitude sound with air-filled porous materials
[NASA-CR-174885] N85-27637

NOISE THRESHOLD
Robust detection of fading narrow-band signals in non-Gaussian noise
[AD-A152262] N85-27124

NOMENCLATURES
DoD manual for standard data elements, part 2
[AD-A152202] N85-27755
DoD manual for standard data elements, part 3
[AD-A152203] N85-27756
DoD manual for standard data elements, part 4
[AD-A152204] N85-27757
DoD manual for standard data elements, part 5
[AD-A152205] N85-27758

NONCONSERVATIVE FORCES
Satellite physical and orbital characteristics N85-27287

NONDESTRUCTIVE TESTS
Nondestructive tests of ceramic components for aircraft turbines N85-26718
Initial quality of advanced joining concepts
[AD-A152241] N85-27027
Echo-response from crack-like two-dimensional reflectors in focused ultrasonic fields. Ultrasonic crack tip method for the determination of crack depth
[BLL-BISI-22062-(9022.06)] N85-27236

NONEQUILIBRIUM FLOW
Hypersonic nonequilibrium gas flow past zero-aspect wing N85-27063

NONLINEAR EQUATIONS
An approximation theory for nonlinear evolution equations and single conservation laws N85-26614
Internal resonance in nonlinear vibrating systems
[REPT-15/1984] N85-27245
A split explicit model for short-term numerical weather prediction N85-27460
Fundamentals of plasma simulation
[DE85-007699] N85-27683

NONLINEAR FEEDBACK
Optimal open loop and nonlinear feedback control for remote orbital capture
[AD-A151967] N85-26859

NONLINEAR SYSTEMS
Application of CFD techniques toward the validation of nonlinear aerodynamic models
[NASA-TM-86715] N85-26671
Alternatives for jet engine control
[NASA-CR-175831] N85-26713
Alternatives for jet engine control
[NASA-CR-175832] N85-26714
Alternatives for jet engine control
[NASA-CR-175833] N85-26715
Observations, theoretical ideas and modeling of turbulent flows: Past, present and future
[NASA-TM-86679] N85-27167
An analytical investigation of dynamic coupling in nonlinear, geared rotor systems N85-27218

NONLINEARITY
The nonlinear analysis of thick composite plates using a cubic spline function N85-27252
Studies of collisional and nonlinear radiative process for development of coherent UV and XUV sources
[AD-A152001] N85-27670

NONOSCILLATORY ACTION
Uniformly high-order accurate non-oscillatory schemes, 1
[NASA-CR-175768] N85-27589

NONUNIFORM MAGNETIC FIELDS
Velocity space diffusion of high energy ions induced by a lower hybrid wave in a nonuniform magnetic field
[IPPJ-714] N85-27681

NOREPINEPHRINE
Does a 50-cycle alternating field have central nervous effects?
[BLL-CE-TRANS-8083-(9022.09)] N85-27507

NORMAL DENSITY FUNCTIONS
Full statistical characteristics of microdeformation
[BLL-M-36076-(5828.4)] N85-27254

NORMALIZING (STATISTICS)
Development of computer aided database design and maintenance tools
[AD-A151782] N85-27537

NORTH AMERICA
Acid precipitation in North America: 1980, 1981 and 1982 annual data summaries from acid deposition system data base
[PB85-162477] N85-27410
Monthly and seasonal weather outlook for mid-January to mid-February 1985, volume 39, number 2, January 15, 1985
[PB85-164572] N85-27500
Monthly and seasonal weather outlook for February 1985, volume 39, number 3, January 30, 1985
[PB85-159424] N85-27502

NORTHERN HEMISPHERE
Full shadow phenomenon in Earth's upper atmosphere N85-27316
A climatic data bank for Northern Hemisphere land areas, 1851-1980
[DE85-007863] N85-27486

NORTHERN SKY
The structure of galactic HI in directions of low total column density
[NASA-CR-175709] N85-27785

NOTCH SENSITIVITY
Creep-fatigue interaction of notched 304 stainless steel bars N85-27249
Initiation, growth and coalescence of small fatigue cracks
[AD-A151799] N85-27265

NOZZLE WALLS
A curved test section for research on transonic shock wave-boundary layer interaction
[VTH-LR-414] N85-26682

NUCLEAR ELECTRIC PROPULSION
Tethered nuclear power for the Space Station
[NASA-TM-87023] N85-26912

NUCLEAR FUSION
Prospects for developing attractive magnetic fusion concepts
[DE85-006925] N85-27684
Fusion-power-core design of a Compact Reversed-Field Pinch Reactor (CRFPR)
[DE85-007710] N85-27692

NUCLEAR INTERACTIONS
Nuclear spectroscopic studies
[DE85-006894] N85-27652

NUCLEAR MAGNETIC RESONANCE
Bound and free moisture studies of solid materials by FTNMR
[DE85-003227] N85-26952
Ion and polymer chain motion in a superionic sodium-poly(ethylene oxide) complex
[AD-A152230] N85-27001

NUCLEAR POWER PLANTS
Information presentation in power plant control rooms
[VTT-320] N85-27668

NUCLEAR REACTIONS
Tables of nuclear cross sections for galactic cosmic rays: Absorption cross sections
[NASA-RP-1134] N85-27665

NUCLEAR REACTORS
Analysis of orbit transfer vehicles for GPS Block 3 satellites
[AD-A152021] N85-26860

NUCLEAR STRUCTURE
Nuclear spectroscopic studies
[DE85-006894] N85-27652

NUCLEAR WEAPONS
US said to seek military advantage in space N85-26831
Military journal on US intelligence satellites N85-26832
Surveillance program for the dissection and analysis of explosive and pyrotechnic components
[DE85-006105] N85-27016

NUMERICAL ANALYSIS
Proceedings of the NAL Symposium on Aircraft Computational Aerodynamics
[NAL-SP-1] N85-26611
Progress of computational fluid dynamics in the world N85-26612
Numerical analyses in aerodynamic design of aero-engine fan N85-26618
Numerical simulation of inviscid compressible flow through three-dimensional cascade N85-26619
A numerical procedure on three-dimensional parabolic flow in duct N85-26620
Nonlinear structural analysis for fiber-reinforced superalloy turbine blades N85-26887
Numerical analysis of flow non-uniformity in the hot gas manifold of the Space Shuttle main engine N85-26899
A study of computational techniques for noncanonical microstrip antennas and arrays
[AD-A152216] N85-27123
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172
In plane stress analysis
[NASA-CR-175775] N85-27259
A decomposition procedure for convex quadratic programs
[AD-A151732] N85-27595
Evaluation of an algorithm for the solution of the time-dependent Euler equations
[AD-A151993] N85-27600
Multiple array processors for ocean acoustic problems
[AD-A152174] N85-27641
Kinetic theory and simulation of multi-species plasmas in Tokamaks excited with ICRF microwaves
[DE85-008119] N85-27691
On the choice of coordinates for semiconductor simulation
[AD-A152214] N85-27708

NUMERICAL CONTROL
Application of AFTI/F-16 task-tailored control modes in advanced multirole fighters N85-26735
X-29A digital flight control system design N85-26736
Some flight test results with redundant digital flight control systems N85-26739
An update on experience on the fly by wire Jaguar equipped with a full-time digital flight control system N85-26740
Optimal control of electric drive with simultaneous control inputs for motor current and flux N85-27049
Development, implementation of industrial lasers reviewed N85-27075
Guidelines for optimization of robotized machining cells N85-27076
The development and application of volume scan and cell tracking capabilities for the analysis of convective cloud systems N85-27451
Corrective-predictive systems
[BLL-M-36063-(5828.4)] N85-27573

NUMERICAL INTEGRATION
Numerical integration through force discontinuities: Solar radiation pressure N85-27298

NUMERICAL STABILITY
Squeezing the most out of Eigenvalue solvers on high-performance computers
[DE85-007569] N85-27565
Stability of functionals determined by moment conditions
[TRITA-NA-8310] N85-27585

NUMERICAL WEATHER FORECASTING
Wind modelling for increased aircraft operational efficiency N85-26652
Data from BOC-yachts: A significant input to Southern Hemisphere analysis N85-27356
A split explicit model for short-term numerical weather prediction N85-27460

O

OBSERVABILITY (SYSTEMS)
Observability in problem of correction of inertial navigation systems using additional information from artificial Earth satellite N85-26785

OCEAN CURRENTS
Development of a Lagrangian drifting buoy N85-27338
Long term drifting float for measuring mean oceanic circulation using ARGOS system N85-27339

ARGOS-tracked drifters in the Rockall Trough N85-27340
Results of an initial trial of a satellite telemetering buoy measuring near surface current N85-27345
OCEAN DATA ACQUISITIONS SYSTEMS
Data Collection and Platform Location by Satellite: ARGOS Users' Conference N85-27333
DB2 and DB3: The next generation — buoys N85-27337
Development of a Lagrangian drifting buoy N85-27338
Long term drifting float for measuring mean oceanic circulation using ARGOS system N85-27339
Monitoring of marine environment N85-27341
Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance N85-27344
Results of an initial trial of a satellite telemetering buoy measuring near surface current N85-27345
An operational buoy network collecting meteorological data N85-27351
Availability of the ARGOS system based on the orbital characteristics of the TIROS-N satellites — oceanographic/meteorological data N85-27352
Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic N85-27355
OCEAN MODELS
Ocean tide models for Topex analysis N85-27291
Tropical Oceans-Global Atmosphere (TOGA) experiment planning for the Brazilian participation in TOGA global climate program
[INPE-3499-PRE/735] N85-27477
Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters
[INPE-3492-PRE/729] N85-27504
OCEAN SURFACE
Topex Gravity Model Development Team activities during fiscal year 1984
[NASA-TM-86208] N85-27285
Results of an initial trial of a satellite telemetering buoy measuring near surface current N85-27345
Atmospheric frontal zone studies
[NASA-CR-175293] N85-27469
On the 1983 drought in northeast Brazil
[INPE-3412-PRE/678] N85-27476
Simulation of a synchronously coupled atmosphere-ocean prediction model
[AD-A152020] N85-27482
OCEAN TEMPERATURE
On the 1983 drought in northeast Brazil
[INPE-3412-PRE/678] N85-27476
OCEANOGRAPHIC PARAMETERS
Tenth Conference of Working Group of Socialist Countries on Remote Sensing of Earth under Intercosmos Program N85-26820
Function of remote sensing in Brazil
[INPE-3314-PRE/621] N85-27329
Diffusion coefficients for coastal water determined from aerial photographs
[INPE-3413-PRE/679] N85-27331
Symposium on Atmospheric Sciences in South Africa
[CSIR-S-331] N85-27442
Air flow of the western coastal boundary of South Africa and its influence on the ocean N85-27459
NASA Oceanic Processes Program annual review
[NASA-TM-87565] N85-27503
OCEANOGRAPHY
China's integrated circuit production N85-27302
USSR report: Earth sciences
[JPRS-UES-85-005] N85-27307
An inexpensive radar-responding relocation device for drifting oceanographic instruments
[AD-A152170] N85-27505
OCEANS
Internal waves in layers of Earth's upper mantle N85-27312
OILS
Oil resistant silicone elastomers
[AD-131523] N85-26987
ON-LINE SYSTEMS
Retrieval performance in a full text journal article database N85-27747
ONBOARD DATA PROCESSING
DORIS: Prediction in Doppler measurement — satellite onboard measurement
[CNES-CT/DTI/MS/AE/170] N85-26843
ONBOARD EQUIPMENT
The development of onboard laser velocimeter at the Saint Louis Institute (France) from 1976 to 1982
[ISL-NB-402/83] N85-27216
Data from BOC-yachts: A significant input to Southern Hemisphere analysis N85-27356
Results of the magnetic field experiments E2 and E4 onboard Helios 1 and Helios 2 — magnetometer development N85-27799
Rome/Goddard Space Flight Center (GSFC) magnetic field experiment: A summary of results — flux gate magnetometer N85-27800
ONE DIMENSIONAL FLOW
The overall reaction concept in premixed, laminar, steady-state flames. 2: Initial temperatures and pressures
[AD-A152132] N85-26944
Evaluation of an algorithm for the solution of the time-dependent Euler equations
[AD-A151993] N85-27600
OPENINGS
Optimum geometry of interblade passages in impellers of thermomolecular vacuum pump N85-27058
OPERATING SYSTEMS (COMPUTERS)
Detailed design of an object oriented, multiprogramming, multitasking operating system for sixteen-bit microcomputers
[AD-A152086] N85-27552
OPERATIONAL HAZARDS
Radio Frequency Radiation (RFR) measurements in operational settings N85-27136
OPERATIONS RESEARCH
Management control systems and interdependencies: An empirical study
[AD-A152280] N85-27746
OPERATOR PERFORMANCE
Shape with and without redundant colour as coding mechanism for simulated radar displays in a time-extended simple vigilance task
[AD-A151683] N85-27533
OPTICAL COMMUNICATION
Optical non-line-of-sight covert, secure high data communication system
[AD-D011607] N85-27087
Photon detection with cooled avalanche photodiodes: Theory and preliminary experimental results N85-27096
The development and implementation of an optical communications laboratory
[AD-A151682] N85-27111
OPTICAL DATA PROCESSING
La Recherche Aerospatiale Bimonthly Bulletin, Number 1984-4, 221/July-August
[ESA-TT-884] N85-26637
SVIT complex for analysis of space photography N85-26819
China's integrated circuit production N85-27302
OPTICAL DENSITY
Use of Goudrian model in studying laws of reflection in vegetation-soil system in optical range. 2: Influence of illumination conditions on spectral brightness coefficients N85-26827
OPTICAL EQUIPMENT
ACT applied to helicopter flight control N85-26738
USSR report: Engineering and equipment
[JPRS-UEQ-84-006] N85-27035
Experience with introduction of Finish perforation of precision parts for optical instruments N85-27038
The utilization of optical fibers in holography
[ISL-R-102/83] N85-27196
Formulation of a coherent light-sheet by means of a cylindrical-spherical optical system
[ISL-R-116/83] N85-27674
OPTICAL MEASURING INSTRUMENTS
Surveying and optical tooling technologies combined to align a skewed beamline at the LAMPF accelerator
[DE85-005902] N85-27684
OPTICAL PROPERTIES
Optical pulsar in the Large Magellanic Cloud remnant 0540-69.3
[DE85-006707] N85-27788
OPTICAL RADAR
Utilization of remote sensing data in the evaluation of air pollution characteristics in the south coast/Southeast Desert Air Basin
[PB85-162063] N85-27407
Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California
[NASA-CR-3901] N85-27463
Conducting a wind sensing study
[NASA-CR-175782] N85-27465
Influence of coherent mesoscale structures on satellite-based Doppler lidar wind measurements
[NASA-CR-175853] N85-27467
Geophysical monitoring for climatic change, number 12
[PB85-172278] N85-27496
Test of lidar inversion algorithm sensitivity to atmospheric backscatter and extinction parameters, revision A
[AD-A152082] N85-27671
Lidar ER2 (ozone). Crystal characterization for harmonic conversion — laser systems
[CERT-2/6129-00] N85-27717
OPTICAL SCANNERS
Testing of scanner-assisted revision of the topographic map 1:25,000 (TK 25) N85-27359
OPTICAL TRACKING
An automatic traversing system for Laser Doppler Anemometer (LDA) applications to wind tunnels and to free jets
[ISL-CO-225/83] N85-27490
OPTICAL TRANSFER FUNCTION
DARPA/TTO program IR binary optics
[AD-A152196] N85-27672
OPTIMAL CONTROL
Application of linear optimal control theory to the design of the elevator control system of the DHC-2 Beaver experimental aircraft
[VTH-LR-411] N85-26729
The effect of inaccuracies in structural models on the control of large space structures
[AD-A151794] N85-26858
Optimal control of electric drive with simultaneous control inputs for motor current and flux N85-27049
Development of graphical pole-zero, root-locus, Bode, Nyquist, and Nichols responses using the OPTSYSX program
[AD-A152148] N85-27555
Development of graphical time response using the OPTSYSX program
[AD-A152221] N85-27557
Some new results on the discrete-time Riccati Equation and their use in the design of optimal regulators and observer-estimators
[AD-A151934] N85-27597
OPTIMIZATION
Optimizing the specifications for an air-surface laser system N85-26644
Alternatives for jet engine control
[NASA-CR-175831] N85-26713
Alternatives for jet engine control
[NASA-CR-175833] N85-26715
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 1: User's manual
[AD-A152268] N85-26725
Probabilistic computer model of optimal runway turnoffs
[NASA-CR-172549] N85-26760
Optimum rotation of solid body with 1 axis of symmetry N85-26781
Hybrid bearings for LH2 and LO2 turbopumps N85-26880
Rotordynamics N85-26888
Advanced energy storage systems
[AD-A152244] N85-26915
Adaptation of continuous beams and the method of optimizing the flexibility of their elastic supports. Theorem on maximal adaptation loading, supplement
[REPT-10/1984-SUPPL] N85-27241
Development and application of optimum sensitivity analysis of structures
[NASA-CR-175857] N85-27257
Parallel computing in optimization
[AD-A151812] N85-27568
H-sets, convex programming and constrained approximation
[TRITA-NA-8308] N85-27587
The essence of invexity
[CSIR-TWISK-321] N85-27626
ORBIT CALCULATION
Flight Experiment Demonstration System (FEDS) functional description and interface document
[NASA-CR-175290] N85-26789
Accuracy in predicting orbital motion of artificial Earth satellite N85-26793
DORIS: Prediction in Doppler measurement — satellite onboard measurement
[CNES-CT/DTI/MS/AE/170] N85-26843
Topex Gravity Model Development Team activities during fiscal year 1984
[NASA-TM-86208] N85-27285
Satellite physical and orbital characteristics N85-27287
Gravity model development software status N85-27289
Radial orbit error spectrum for Topex N85-27292
ORBIT PERTURBATION
The 6 pi-periodic solutions of plane restricted elliptical 3-body problem in neighborhood of libration points N85-26770
Stability of periodic satellite motions relative to center of mass in circular orbit N85-26780
Simulation of a low orbit restitution. Covariance analysis of the position-velocity by Doppler and accelerometer measurements
[CNES-CT/DTI/MS/AE/166] N85-26836

ORBIT TRANSFER VEHICLES
Analysis of orbit transfer vehicles for GPS Block 3 satellites
[AD-A152021] N85-26860
ORBITAL ASSEMBLY
Construction and functioning of extended orbital systems N85-26814
ORBITAL ELEMENTS
Gravity model development software status N85-27289
Optical best arc RMS test results N85-27290
ORBITAL LAUNCHING
Analysis of orbit transfer vehicles for GPS Block 3 satellites
[AD-A152021] N85-26860
ORBITAL MECHANICS
Integrable cases of restricted doubly averaged 3-body problem N85-26778
Optimal relative data weights N85-27296
Numerical integration through force discontinuities: Solar radiation pressure N85-27298
ORBITAL POSITION ESTIMATION
Accuracy in predicting orbital motion of artificial Earth satellite N85-26793
Simulation of a low orbit restitution. Covariance analysis of the position-velocity by Doppler and accelerometer measurements
[CNES-CT/DTI/MS/AE/166] N85-26836
Optical best arc RMS test results N85-27290
ORBITAL VELOCITY
Simulation of a low orbit restitution. Covariance analysis of the position-velocity by Doppler and accelerometer measurements
[CNES-CT/DTI/MS/AE/166] N85-26836
ORBITS
Construction and functioning of extended orbital systems N85-26814
ORDER-DISORDER TRANSFORMATIONS
On the feasibility of Ab Initio calculations of ordering alloy phase diagrams
[DE85-007073] N85-26979
ORDNANCE
The remote detection of polynuclear aromatic hydrocarbons using laser-induced fluorescence
[AD-A152294] N85-27013
ORGANIC COMPOUNDS
Analytical methods for determination of POHC (Principal Organic Hazardous Constituents) in combustion products
[PB85-161578] N85-26955
ORGANIZATIONS
Measurement capabilities of the Bendix Metrology Organization
[DE85-005795] N85-27029
SELPER (Latin American Society of Remote Sensory Specialists)
[INPE-3315-PRE/822] N85-27328
National Telecommunications and Information Administration authorization
[GPO-38-660] N85-27766
ORGANOMETALLIC COMPOUNDS
Synthesis of phenols from metal-carbynes and diynes
[AD-A151913] N85-26997
ORIFICE FLOW
Flow rate and pressure profiles for 1 to 4 axially alined orifice inlets
[NASA-TP-2460] N85-27165
ORIFICES
Flow rate and pressure profiles for 1 to 4 axially alined orifice inlets
[NASA-TP-2460] N85-27165
ORION NEBULA
Molecular spectroscopy from the Kuiper Airborne Observatory
[NASA-CR-175748] N85-27763
OROGRAPHY
Theory and modeling of the interaction between subgrid scale orography and large scale flow
[DM-43] N85-27440
ORTHONORMAL FUNCTIONS
Canonical analysis of the fermion sector in higher-derivative supergravity
[DE85-007828] N85-27635
ORTHOPHOTOGRAPHY
What does digital image processing perform in the production of orthophotomaps N85-27368
ORTHOTROPIC CYLINDERS
Stability of anisotropic cylindrical sandwich shells N85-27065
ORTHOTROPIC PLATES
The effects of pin elasticity, clearance, and friction on the stresses in a pin-loaded orthotropic plate
[NASA-CR-175816] N85-26927
An approximation to the problem of a pin-loaded hole in an orthotropic plate
[VTH-LR-386] N85-27278
ORTHOTROPIC SHELLS
An analysis for axially compressed orthotropic shells with a multimode imperfection representation
[VTH-LR-422] N85-27281
OSCILLATIONS
Application of the hydraulic system frequency response program to propellant feed systems
[AD-A151824] N85-26914
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
Internal resonance in nonlinear vibrating systems
[REPT-15/1984] N85-27245
OUTER RADIATION BELT
Bursts of relativistic electrons in magnetopause and in outer radiation belt N85-26801
OUTLIERS (STATISTICS)
Some new estimation methods for weighted regression when there are possible outliers
[AD-A152104] N85-27602
OUTPUT
Multivariable statistical modelling and its application N85-27617
OV-1 AIRCRAFT
Preliminary airworthiness evaluation of a National Aeronautics and Space Administration automated stall warning system for an OV-1 aircraft
[AD-A152010] N85-26708
OXIDATION
Effects of surface chemistry on hot corrosion life
[NASA-CR-174915] N85-26711
OXIDATION-REDUCTION REACTIONS
Cycling performance of the iron-chromium redox energy storage system
[NASA-TM-87034] N85-27387
OXYGEN
Ignition of metals in high pressure oxygen N85-26874
Hazards in welding due to oxygen changes in the workplace atmosphere
[BLL-WI-TRANSL-684-(9312.57)] N85-27224
OZONE
Impact of ozone on vegetation
[PB85-159937] N85-27403
Free radicals in the stratosphere: A new observational technique N85-27415
Research and development of new instruments N85-27418
In-situ stratospheric ozone measurements: Recent results and their implications N85-27419
Role and fate of ozone in the atmosphere N85-27421
Geophysical monitoring for climatic change, number 12
[PB85-172278] N85-27496
OZONOMETRY
One approach to remote sensing of total ozone content N85-26822

P

PACIFIC OCEAN
The ARGOS system used for tracking gray whales N85-27347
PACKET SWITCHING
Mathematical programming in computer network design
[AD-A152275] N85-27558
A study of topologies and protocols for fiber optic local area network
[NASA-CR-175771] N85-27669
PAINTS
Investigation of the influence of some paint systems and water displacing corrosion inhibitors on anodic undermining corrosion of aluminum 2024 clad alloy — aircraft structures
[VTH-LR-443] N85-27009
PALLADIUM ALLOYS
Study of the kinetics and thermodynamics of hydrogen in Pd-based alloys
[DE85-007341] N85-26969
PARABOLAS
The nonlinear analysis of thick composite plates using a cubic spline function
[AD-A152115] N85-27268
PARABOLIC REFLECTORS
A study of structural concepts for ultralightweight spacecraft
[NASA-CR-175765] N85-26848
A bibliography of reports of the Sandia solar thermal distributed receiver systems project
[SAND-84-0313] N85-27378
Manufacturing cost analysis of a parabolic dish concentrator (General Electric design) for solar thermal electric power systems in selected production volumes
[NASA-CR-175772] N85-27380
PARACHUTES
Parachute extraction device for ultralight gliders
[CH-643499-A5] N85-26663
PARALLEL PROCESSING (COMPUTERS)
Parallel time 0(log N) acceptance of deterministic CFLs
[AD-A152255] N85-27539
Parallel computation of multiple-scale problems
[DE85-007230] N85-27563
Parallel computing in optimization
[AD-A151812] N85-27568
Local uniform mesh refinement on loosely-coupled parallel processors
[AD-A152199] N85-27571
Complexity of dense linear system solution on a multiprocessor ring
[AD-A151970] N85-27596
Computational plasma physics and supercomputers, revision 1
[DE85-007228] N85-27687
PARALLEL PROGRAMMING
Recent trends in software technology for vector processors N85-26615
Recent advances in supercomputers N85-26625
Reliability models for dataflow computer systems
[NASA-CR-175813] N85-27543
PARAMAGNETISM
Paramagnetic form factors from itinerant electron theory
[DE85-005272] N85-26973
PARAMETER IDENTIFICATION
Optimum parameters of aerogyroscopic satellite orientation system N85-26782
Development and application of optimum sensitivity analysis of structures
[NASA-CR-175857] N85-27257
PARSING ALGORITHMS
Evaluating syntactic constraints to speech recognition in a fighter aircraft environment
[AD-A152117] N85-27119
PARTIAL DIFFERENTIAL EQUATIONS
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
A split explicit model for short-term numerical weather prediction N85-27460
Local uniform mesh refinement on loosely-coupled parallel processors
[AD-A152199] N85-27571
Uniformly high-order accurate non-oscillatory schemes, 1
[NASA-CR-175768] N85-27589
On the choice of coordinates for semiconductor simulation
[AD-A152214] N85-27708
PARTICLE ACCELERATION
High energy particle acceleration by coherent electromagnetic waves propagating across the magnetic field
[IPPJ-717] N85-27679
Fundamentals of plasma simulation
[DE85-007699] N85-27683
PARTICLE ACCELERATOR TARGETS
Proceedings of the Workshop on Polarized Targets in Storage Rings
[DE85-002704] N85-27653
PARTICLE ACCELERATORS
Two-dimensional beat wave acceleration simulation
[DE85-005961] N85-27214
PARTICLE COLLISIONS
Tables of nuclear cross sections for galactic cosmic rays: Absorption cross sections
[NASA-RP-1134] N85-27665
PARTICLE DIFFUSION
Nonlinear DSA difference schemes for radiative transfer applications
[DE85-005729] N85-27611
PARTICLE ENERGY
Secondary ion mass spectrometry studies of solids and surfaces
[AD-A151744] N85-26939
PARTICLE FLUX DENSITY
Correlated fluctuations of charged particle fluxes and magnetic field according to data from Intercosmos-10 satellite N85-26802
PARTICLE PRECIPITATION
A study of the generation mechanisms of high latitude and equatorial F-region irregularities using DE-2 data
[NASA-CR-175745] N85-27423

PARTICLE SIZE DISTRIBUTION
Ultrasonic dispersion of soils for routine particle size analysis: Recommended procedures
[DE85-005530] N85-27643
PARTICLE THEORY
Inflation from extra dimensions
[DE85-007834] N85-27787
PASSENGER AIRCRAFT
A preliminary analysis of C-12 aircraft usage by the Navy Air Logistics System
[AD-A151921] N85-26634
PASSIVE SATELLITES
A study of structural concepts for ultralightweight spacecraft
[NASA-CR-175765] N85-26848
PATTERN RECOGNITION
Scene analysis using recursive frequency domain correlation with energy normalization
[AD-A151777] N85-27596
An IKBS approach to image understanding
[AD-A151992] N85-27599
Ultrasonic testing of carbon fiber reinforced plastics (CFRP) using pattern recognition methods
[MBB-BB-563/84-O] N85-27726
PATTERN REGISTRATION
Study of the urban evolution of Brasilia with the use of LANDSAT data
[E85-10101] N85-27321
PAVEMENTS
Study of acceptance criteria for joint densities in bituminous airport pavements
[FAA-PM-85-5] N85-26761
PAYLOAD RETRIEVAL (STS)
The investigation of tethered satellite system dynamics
[NASA-CR-175855] N85-26854
PDP 11 COMPUTER
A procedure for communications with PDP-10 and PDP-11 (IS/1 UNIX) type computers through use of CPT word processing equipment, revision 1
[DE85-007596] N85-27540
PELLETS
Robotic thermal battery pellet fabrication
[DE85-007755] N85-27154
PERFORATING
Experience with introduction of Finish perforation of precision parts for optical instruments N85-27038
PERFORMANCE PREDICTION
Simulation: A tool for cost-effective systems design and live test reduction N85-26657
Analytical fuel property effects--small combustors
[NASA-CR-174736] N85-26709
Technical overview structural dynamics N85-26883
Solar elements with distributed parameters N85-27036
PERFORMANCE TESTS
The series 2000: A miniature gas bearing DTG for low cost strapdown guidance and control N85-26648
High-pressure hydrogen testing of single crystal superalloys for advanced rocket engine turbopump turbine blades N85-26875
Instrumentation technology overview N85-26903
Operational test results of a prototype superconducting power transmission system and their extrapolation to the performance of a large system
[DE85-006731] N85-27153
Management of vacuum leak-detection processes, standards and calibration
[DE85-006705] N85-27202
Documentation and solar cell modules
[NASA-CR-175769] N85-27384
Effect of precipitation on wind turbine performance
[NASA-TM-86986] N85-27385
Shape with and without redundant colour as coding mechanism for simulated radar displays in a time-extended simple vigilance task
[AD-A151683] N85-27533
PERIODIC VARIATIONS
The 6 pi-periodic solutions of plane restricted elliptical 3-body problem in neighborhood of libration points N85-26779
Stability of periodic satellite motions relative to center of mass in circular orbit N85-26780
Periodicity of variations in galactic cosmic ray fluxes and solar activity parameters near 20th cycle minimum N85-26791
Variations in intensity of secondary cosmic radiation observed on 10-11 August 1981 N85-26796
Possible period of Jovian activity and possibility of seasons N85-26810
Precipitable water in the atmosphere, determined from surface dewpoint values N85-27457
Influence of coherent mesoscale structures on satellite-based Doppler lidar wind measurements
[NASA-CR-175853] N85-27467
PERMEABILITY
Ionic conduction and water diffusion in Li (BETA)-alumina
[DE85-007548] N85-27005
PERSONAL COMPUTERS
Personal computer aided decision analysis
[AD-A151911] N85-27743
PERSONNEL
Investigation of the requirement for auxiliary heating of Canadian forces personnel
[AD-A151950] N85-27522
Summary of Research, Academic Departments, 1983 - 1984
[AD-A151724] N85-27741
PERSONNEL SELECTION
Automated CPX support system preliminary design phase
[NASA-CR-175784] N85-27091
PERTURBATION
Method for evaluating perturbation in algorithms for solving navigational problems N85-26783
Identification and control of structures in space
[NASA-CR-175790] N85-26850
Formulas for updating the generalized inverse of a symmetric matrix perturbed by a symmetric rank 2 matrix composed of 2 nonsymmetric DYADS
[AD-A151736] N85-27629
PERTURBATION THEORY
Sensitivity of the stationary distribution vector for an ergodic Markov chain
[DE85-006979] N85-27621
PETROLEUM PRODUCTS
Studies related to the deep Earth gas: 1983
[PB85-171114] N85-27373
PH
Acid rain: Towards automated monitoring N85-27444
PHASE COHERENCE
Study of the coupling between average, coherent and turbulent fields in a circular excited free jet
[ISL-R-115/83] N85-27184
PHASE DIAGRAMS
On the feasibility of Ab initio calculations of ordering alloy phase diagrams
[DE85-007073] N85-26979
Ca-Ga, Sr-Ga and Ba-Ga binary systems
[DE85-006454] N85-26980
PHASE LOCKED SYSTEMS
Digital filters for digital phase-locked loops N85-27104
Phase-lock fiber optic interferometer
[AD-D011603] N85-27191
PHASE MODULATION
A phase modulation evaluation procedure for an ARGOS type signal N85-27336
PHASE SHIFT CIRCUITS
Wavelength multiplexer-demultiplexer
[AD-D011608] N85-27140
PHASE SHIFT KEYING
Bit error rate of coherent M-ary PSK N85-27096
PHASE TRANSFORMATIONS
Transformation of nitrogen oxides while sampling combustion products
[AD-A152184] N85-26945
Models of long-period superstructure
[DE85-007659] N85-26981
PHENOLS
Synthesis of phenols from metal-carbynes and diynes
[AD-A151913] N85-26997
PHONEMES
Implementation of a real-time, interactive, continuous speech recognition system
[AD-A151936] N85-27117
Evaluating syntactic constraints to speech recognition in a fighter aircraft environment
[AD-A152117] N85-27119
PHONETICS
Automation of the process of speech signal segmentation in an analogic-numeric system
[REPT-5/1984] N85-27082
PHOSPHATES
Characteristics of polyacrylic acid-complexed zinc phosphate conversion films deposited on metal surfaces
[DE85-004057] N85-26974
PHOSPHORS
Investigation of basic characteristics of laser heating in thermoluminescence and of laser-stimulated luminescence
[AD-A152143] N85-27212
PHOSPHORUS COMPOUNDS
Structural inhomogeneities in amorphous nickel-phosphorus alloy
[BLL-M-36103-(5828.4)] N85-26960
PHOTOABSORPTION
Heliocentric sail problem with variable gravity field reduction N85-26816
PHOTOACOUSTIC SPECTROSCOPY
Experimental investigation of the pulsed photoacoustic effect produced on a solid surface
[AD-A152114] N85-27640
PHOTOCHEMICAL OXIDANTS
Evaluation of chemical reaction mechanisms for photochemical smog. Part 2: Quantitative evaluation of the mechanisms, revised
[PB85-166080] N85-27408
PHOTOCHEMICAL REACTIONS
Measurement of elements in the stratosphere
[NASA-CR-175891] N85-27414
Free radicals in the stratosphere: A new observational technique N85-27415
Effect of traffic and meteorology on air pollution N85-27452
PHOTODIODES
Photon detection with cooled avalanche photodiodes: Theory and preliminary experimental results N85-27096
PHOTODISSOCIATION
Atmospheric chemistry
[INPE-3190-PRE/554] N85-27430
Cometary atmospheres: Modeling the spatial distribution of observed neutral radicals
[NASA-CR-175852] N85-27781
PHOTOELECTRIC GENERATORS
Space power plants N85-26813
PHOTOGEOLOGY
Function of remote sensing in Brazil
[INPE-3314-PRE/621] N85-27329
PHOTOGRAMMETRY
Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and photomaps N85-26829
Use of vector processors in cartographic raster data processing, with special regard to the AP-120B vector processor N85-27358
Standards and specifications for geodetic control networks
[PB85-166478] N85-27374
Investigations of the accuracy of the Digital Photogrammetry System (DPS), a rigorous three-dimensional compilation process for pushbroom imagery
[MBB-UA-753/83-O] N85-27734
PHOTOGRAPHIC FILM
Infrared presensitization photography N85-27189
PHOTOLYSIS
In-situ stratospheric ozone measurements: Recent results and their implications N85-27419
Water vapor N85-27420
PHOTOMAPPING
Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and photomaps N85-26829
PHOTOMAPS
What does digital image processing perform in the production of orthophotomaps N85-27368
PHOTOMETERS
Research and development of new instruments N85-27418
PHOTONS
Photon detection with cooled avalanche photodiodes: Theory and preliminary experimental results N85-27096
PHOTOVOLTAIC CELLS
Solar elements with distributed parameters N85-27036
Photovoltaic powered vaccine refrigerator-freezer systems field test results
[NASA-TM-86972] N85-27386
Photovoltaic cell reliability research: Investigation of accelerated stress factors and failure-degradation mechanisms in terrestrial solar cells
[NASA-CR-175815] N85-27388
Design and development of a linear Fresnel lens air-cooled photovoltaic module and a stand-alone photovoltaic collector array
[DE85-006854] N85-27391
PHOTOVOLTAIC EFFECT
MOD silver metallization for photovoltaics
[NASA-CR-175773] N85-27381
Maintenance of photovoltaic power systems
[AD-A152299] N85-27390
Study of the degradation of short-circuit current and the open-circuit tension of spatial solar cells as a function of the fluency of 1MeV electrons
[INPE-3356-PRE/634] N85-27814
PHYSICS
Overview of the physics issues at the SSC
[DE85-007074] N85-27634
PHYSIOLOGICAL EFFECTS
Percutaneous connectors
[NASA-CR-175827] N85-27508

PIEZOELECTRIC CRYSTALS
Suppression of vibration effects on piezoelectric crystal resonators
[AD-D011625] N85-27142
Acceleration resistant combination of opposite-handed piezoelectric crystals
[AD-D011626] N85-27143
Dual species ion implantation of ternary compounds based on In-Ga-As
[AD-D011617] N85-27698
PIEZOELECTRICITY
Piezoelectric and pyroelectric polymers N85-27008
PIEZORESISTIVE TRANSDUCERS
An advanced solid state pressure transducer for high reliability SSME application N85-26905
PILE FOUNDATIONS
Experimentally determined distribution of stress around a horizontally loaded model pile in dense sand
[CE-43] N85-27239
PILOT PERFORMANCE
A comparison of pictorial and speech warning messages in the modern cockpit
[AD-A151917] N85-26706
PILOTS (PERSONNEL)
Aspects of application of ACT systems for pilot workload alleviation N85-26734
PINS
The effects of pin elasticity, clearance, and friction on the stresses in a pin-loaded orthotropic plate
[NASA-CR-175816] N85-26927
An approximation to the problem of a pin-loaded hole in an orthothropic plate
[VTH-LR-386] N85-27278
PIONS
A 1-2 GeV/c beam line for hypernuclear and kaon research
[DE85-007623] N85-27659
PIPELINES
Underwater pipeline: Welding by high frequency induction
[BLL-WI-TRANS-682-(9312.57)] N85-27221
PIPELINING (COMPUTERS)
Squeezing the most out of Eigenvalue solvers on high-performance computers
[DE85-007509] N85-27565
PIPES (TUBES)
Filmwise condensation of steam on low integral-finned tubes
[AD-A152220] N85-27176
Magnetic method of inspecting mechanical properties of general purpose tubes
[BLL-M-36064-(5828.4)] N85-27235
PISTON ENGINES
Overview of the 1985 NASA Lewis Research Center SP-100 free-piston Stirling engine activities
[NASA-TM-87028] N85-27769
PISTONS
Active control landing gear for ground loads alleviation N85-26749
PITTING
Investigation of the pitting potential of rapidly solidified aluminum-lithium alloys
[VTH-LR-434] N85-26986
PLANET EPHEMERIDES
Relating the planetary ephemerides and the radio reference frame N85-27095
PLANETARY BOUNDARY LAYER
Study of the functions of similarity of the planetary boundary layer. Part 1: Theory
[INPE-3129-PRE/520-PT-1] N85-27428
Study of the functions of similarity of the planetary boundary layer. Part 2: Results
[INPE-3130-PRE/521-VOL-2] N85-27429
PLANETARY MAGNETIC FIELDS
Orientation and strength of Martian magnetic dipole N85-26808
Possible configuration of Martian magnetosphere N85-26809
PLANETARY WAVES
Wave dynamics and transport in the stratosphere
[NASA-CR-175789] N85-27413
PLANKTON
Ecology of Pamlico River, North Carolina: An estuarine profile
[PB85-155703] N85-27404
MARMAP survey of the continental shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia (1977 - 1983). Atlas 1: Summary of operations
[PB85-150985] N85-27506
PLANTS (BOTANY)
Research on zero-gravity botany apparatus N85-26811
Ecology of Pamlico River, North Carolina: An estuarine profile
[PB85-155703] N85-27404
Genetic engineering of plants: Agricultural research opportunities and policy concerns
[DE85-006771] N85-27513
PLASMA CLOUDS
Dependence of equatorial F-region plasma bubble rise velocity and dynamo electric field on solar cycle
[INPE-3439-PRE/696] N85-27434
PLASMA CONTROL
Magnetohydrodynamic stability of spheromak plasma in toroidal flux conserver with rectangular cross section
[IPPJ-716] N85-27678
TOKASTAR: A Tokamak stellarator hybrid with possible bean-shaped operation
[IPPJ-718] N85-27680
Spherical torus, compact fusion at low field
[DE85-006983] N85-27689
Time-resolving electron temperature diagnostic for ALCATOR C
[DE85-004916] N85-27690
PLASMA DENSITY
Direct evidence for solar wind control of Jupiter's hectometer-wavelength radio emission
[NASA-TM-86073] N85-27790
PLASMA DIFFUSION
Velocity space diffusion of high energy ions induced by a lower hybrid wave in a nonuniform magnetic field
[IPPJ-714] N85-27681
PLASMA DRIFT
Coupled plasma-neutral transport model for the scrape-off region
[DE85-007559] N85-27695
PLASMA DYNAMICS
Poloidal rotation of magnetic fluctuations in reversed field pinch plasma
[IPPJ-715] N85-27677
A four-field model for Tokamak plasma dynamics
[DE85-007111] N85-27694
PLASMA HEATING
Determining effective rate of plasma heating in outer equatorial ionosphere using data from ISIS-1 and ISIS-2 satellites N85-26797
Velocity space diffusion of high energy ions induced by a lower hybrid wave in a nonuniform magnetic field
[IPPJ-714] N85-27681
Tokamak systems code
[DE85-008147] N85-27696
PLASMA INTERACTIONS
Discrete foundation for physics and experience
[DE85-008172] N85-27720
PLASMA LAYERS
Modeling plasma mantle of Earth's magnetosphere N85-26790
PLASMA PHYSICS
Optimizing computational efficiency and user convenience in plasma simulation codes
[DE85-007661] N85-27682
Computational plasma physics and supercomputers, revision 1
[DE85-007228] N85-27687
A four-field model for Tokamak plasma dynamics
[DE85-007111] N85-27694
PLASMA PINCH
Poloidal rotation of magnetic fluctuations in reversed field pinch plasma
[IPPJ-715] N85-27677
PLASMA SPECTRA
Spectroscopic studies of a railgun muzzle flash
[MRL-R-952] N85-26837
PLASMA SPRAYING
Vacuum plasma coatings for turbine blades N85-26869
PLASMA WAVES
Two-dimensional beat wave acceleration simulation
[DE85-005961] N85-27214
Plasma waves in the solar wind: Ten years of Helios observations N85-27801
PLASMAS (PHYSICS)
Digital image analysis of four-frame holographic plasma and neutral gas interferograms
[DE85-008397] N85-27200
Equatorial F-region irregularity latitudinal extension and dynamo electric field
[INPE-3494-PRE/731] N85-27433
Fundamentals of plasma simulation
[DE85-007699] N85-27683
High efficiency ionizer using a hollow cathode discharge plasma
[DE85-006690] N85-27693
PLASTIC DEFORMATION
Plastic deformation of crystalline polymers
[AD-A152090] N85-26899
Multinomial form of the solution of problems of the statistics of elastic rectangular disks
[REPT-17/1984] N85-27244
Determination of failure characteristics of materials and structures
[AD-A152073] N85-27266
PLASTIC FLOW
On the accurate representation of large, strain non-proportional plastic flow in ductile materials
[DE85-007106] N85-27273
PLASTIC MEMORY
Production of shaped parts of NITINOL alloys by solid-state sintering
[AD-A152089] N85-26966
PLASTIC PROPERTIES
Predicting fully plastic mode 2 crack growth from an asymmetric defect
[AD-A152227] N85-27269
Numerical resolution calculation for elastic-plastic impact problems
[AD-A152292] N85-27270
On the accurate representation of large strain non-proportional plastic flow in ductile materials
[DE85-007106] N85-27273
PLATES (STRUCTURAL MEMBERS)
Model for computing late detonations initiated in propellants by impact (XDT reactions)
[DE85-007377] N85-27019
Dynamic response of shells and plates subjected to variable magnitude traveling loads N85-27250
The nonlinear analysis of thick composite plates using a cubic spline function N85-27252
Stress analysis of the space telescope focal plane structure joint
[NASA-CR-175797] N85-27284
PLAYBACKS
Operation of autotracking system in various video playback modes N85-27055
PLOTTING
A heuristic solution to the spacing problem: Maximizing the minimum Euclidean distance among N points in a convex region
[AD-A152116] N85-27603
PLUMES
A method for simulating 3-D aircraft flow fields with jet plume effects
[NASA-CR-175802] N85-26664
PNEUMATIC EQUIPMENT
Dynamic response of fluid transmission lines
[AD-A151926] N85-27171
POINCARE PROBLEM
Stability of periodic satellite motions relative to center of mass in circular orbit N85-26780
POINTING CONTROL SYSTEMS
Impact of magnetic isolation on pointing system performance in the presence of structural flexibility
[NASA-CR-172481] N85-26861
POISSON EQUATION
Polycrystalline semiconductor heterojunction modelling (CdS/CuInSe(sub)2)
[DE85-002913] N85-27713
POLAND
Automation of the process of speech signal segmentation in an analogic-numeric system
[REPT-5/1984] N85-27082
POLAR ORBITS
Availability of the ARGOS system based on the orbital characteristics of the TIROS-N satellites --- oceanographic/meteorological data N85-27352
POLAR REGIONS
A study of the generation mechanisms of high latitude and equatorial F-region irregularities using DE-2 data
[NASA-CR-175745] N85-27423
POLARIMETERS
Polarimetric image recorder
[AD-D011605] N85-27192
POLARITY
A multipole model of the observed cerebral cortex magnetic field
[AD-A152237] N85-27526
POLARIZATION (CHARGE SEPARATION)
Theoretical and experimental comparisons of nearfield electrogalvanic fields due to nonlinear polarization layers
[AD-A152085] N85-27149
POLARIZATION (SPIN ALIGNMENT)
Proceedings of the Workshop on Polarized Targets in Storage Rings
[DE85-002704] N85-27653
Spin-polarized quantum systems
[DE85-006914] N85-27667
POLARIZATION (WAVES)
Holoswitch, phase 1
[AD-A152212] N85-27196
Results of simultaneous measurements of absorption and polarization of radio waves reflected from ionosphere N85-27313
POLARIZED LIGHT
Holoswitch, phase 1
[AD-A152212] N85-27196

POLICIES
USSR report: Space
[JPRS-USP-85-004] N85-26772
POLLUTION
Acid rain: Towards automated monitoring
N85-27444
The seasonal cycle of atmospheric CO in the Southern Hemisphere N85-27447
POLLUTION CONTROL
Analytical methods for determination of POHC (Principal Organic Hazardous Constituents) in combustion products
[PB85-161578] N85-26955
POLLUTION MONITORING
Utilization of remote sensing data in the evaluation of air pollution characteristics in the south coast/Southeast Desert Air Basin
[PB85-162063] N85-27407
Symposium on Atmospheric Sciences in South Africa
[CSIR-S-331] N85-27442
Elemental analysis of aerosols in Transvaal urban and power-producing areas using time and size-resolved samples N85-27443
Acid rain: Towards automated monitoring
N85-27444
A wind-bivane/microprocessor system for on-line prediction and display of pollutant distributions
N85-27449
POLLUTION TRANSPORT
Analytical methods for determination of POHC (Principal Organic Hazardous Constituents) in combustion products
[PB85-161578] N85-26955
POLYATOMIC MOLECULES
Identification and properties of molecular systems of potential use in solar-pumped lasers
[NASA-CR-175804] N85-27207
POLYCRYSTALS
Secondary ion mass spectrometry studies of solids and surfaces
[AD-A151744] N85-26939
POLYESTER RESINS
Fluorinated polyesters
[AD-D011611] N85-26988
POLYETHYLENES
Plastic deformation of crystalline polymers
[AD-A152090] N85-26999
POLYISOPRENES
Plastic deformation of crystalline polymers
[AD-A152090] N85-26999
POLYMER MATRIX COMPOSITES
Effect of counterface material type and its topography on the tribological properties of polyimide composites
[NASA-TM-87036] N85-26993
Accuracy of the calculated stress field around a craze
[DE85-005520] N85-27272
POLYMERIZATION
Oil resistant silicone elastomers
[AD-131523] N85-26987
Formulation/cure technology for ultrahigh molecular weight silphenylene-siloxane polymers
[NASA-TP-2476] N85-26990
Synthesis of phenols from metal-carbynes and diynes
[AD-A151913] N85-26997
Theoretical studies of solar-pumped lasers
[NASA-CR-175801] N85-27206
NBS (National Bureau of Standards) research reports
[PB85-127421] N85-27764
POLYMERS
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26985
POLYNOMIALS
Multinomial form of the solution of problems of the statistics of elastic rectangular disks
[REPT-17/1984] N85-27244
Quadratic spaces over discrete Hodge algebras
N85-27593
POLYSTYRENE
Development of a polystyrene insulation system
[DE85-006950] N85-27180
POLYURETHANE FOAM
Damage caused to polyurethane foams by aging, simulated sunlight exposure, heat and fire
[AD-A152040] N85-26996
POLYVINYL FLUORIDE
Piezoelectric and pyroelectric polymers N85-27008
POPULATION INVERSION
Population inversion in laser-initiated vacuum arcs
[AD-A151958] N85-27210
POROSITY
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction
[NASA-CR-175788] N85-26665
POROUS MATERIALS
Ductility equation for porous metals and its linearization
[BLL-M-36118-(5828.4)] N85-26958
Two-d heat transfer through porous media with heat generation
[AD-A151965] N85-27173
Interaction of finite-amplitude sound with air-filled porous materials
[NASA-CR-174885] N85-27637
POSITION (LOCATION)
Data Collection and Platform Location by Satellite: ARGOS Users' Conference N85-27333
Location and data collection satellite system ARGOS. User's guide — satellite based localization N85-27371
POSITION ERRORS
Studies into location accuracy — ARGOS system
N85-27334
Positioning accuracy of the ARGOS system in operational use N85-27335
An evaluation of the performance of a new storm tracking methodology
[AD-A152234] N85-27484
POSITIONING
Criteria for the classification of hydrographic positioning data
[AD-A152283] N85-26697
Positioning of a robotic manipulator through the use of visual feedback
[AD-A151933] N85-27577
POSITRON ANNIHILATION
Positron annihilation studies of vacancy formation in tungsten, chromium, and niobium
[DE85-006837] N85-27710
POWDER (PARTICLES)
Test and modeling for sintering theory
[DE85-007761] N85-27004
POWDER METALLURGY
Powder metallurgy bearings for advanced rocket engines N85-26881
Microstructures and properties of rapidly solidified alloys
[NASA-CR-172377] N85-26961
East Europe report: Science and technology
[JPRS-ESA-85-019] N85-27077
Research on products obtained by powder metallurgy
N85-27081
POWER CONDITIONING
Advanced energy storage systems
[AD-A152244] N85-26915
POWER EFFICIENCY
Advanced energy storage systems
[AD-A152244] N85-26915
Effect of precipitation on wind turbine performance
[NASA-TM-86986] N85-27385
POWER LINES
Operational test results of a prototype superconducting power transmission system and their extrapolation to the performance of a large system
[DE85-006731] N85-27153
POWER SERIES
Use of REDUCE 2 for symbolic programming
[INPE-3355-PRE/633] N85-27544
PREBURNERS
Fiber optic Raman thermometer for Space Shuttle main engine preburner profiling N85-26904
PRECIPITATION (CHEMISTRY)
Thermal annealing of Fe implanted Al2O3 in oxidizing and reducing environment: Revised version
[DE85-007546] N85-26983
PRECIPITATION (METEOROLOGY)
Cloud-seeding for regulating precipitaion in Moscow area N85-27308
Regularities in recent changes in surface air temperature and atmospheric precipitaion fields N85-27311
Effect of precipitation on wind turbine performance
[NASA-TM-86986] N85-27385
Precipitable water in the atmosphere, determined from surface dewpoint values N85-27457
Summary of Meteorological Observations, Surface (SMOS), Dallas, Texas
[AD-A150599] N85-27480
A climatic data bank for Northern Hemisphere land areas, 1851-1980
[DE85-007863] N85-27486
SCPP (Sierra Cooperative Pilot Project) data collection and analysis. Volume 1: Executive summary
[PB85-156065] N85-27494
Monthly and seasonal weather outlook for mid-January to mid-February 1985, volume 39, number 2, January 15, 1985
[PB85-164572] N85-27500
Monthly and seasonal weather outlook for February 1985, volume 39, number 3, January 30, 1985
[PB85-159424] N85-27502
PREDICTION ANALYSIS TECHNIQUES
Confined turbulent swirling recirculating flow predictions
[NASA-CR-174917] N85-26716
Thrust chamber life prediction N85-26865
Elevated temperature biaxial fatigue
[NASA-CR-175795] N85-27263
The practical and theoretical significance of small cracks: An evaluation
[VTH-LR-432] N85-27283
An appraisal of the duration of the recent drought in northeast Brazil and a forecast for 1985
[INPE-3477-PRE/720] N85-27478
PREDICTIONS
Significant parameters for predicting flame spread
[PB85-178002] N85-27034
Use of forest modeling to project acid rain effects
[DE85-005251] N85-27400
A study of the effect of gently varying terrain on atmospheric flow near the surface N85-27411
PREMIXED FLAMES
The overall reaction concept in premixed, laminar, steady-state flames. 2: Initial temperatures and pressures
[AD-A152132] N85-26944
On the analytic calculation of premixed flames
[VTH-LR-417] N85-26954
PREPARATION
A robotic system for preparing reagent and dilution vials
[DE85-008262] N85-27231
PRESERVING
Characterization-curing-property studies of HBRF 55A resin formulations
[NASA-CR-175836] N85-26989
PRESSES
Experience with introduction of Finish perforation of precision parts for optical instruments N85-27036
PRESSING (FORMING)
Method of selecting robotized system design for pressing process N85-27040
Industrial robots and automatic manipulators for forging and pressing operations at Second International Exhibition N85-27044
PRESSURE
Sources of improvement in quality of contact butt welding of wire
[BLL-M-36085-(5828.4)] N85-27225
PRESSURE DISTRIBUTION
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction
[NASA-CR-175788] N85-26665
Flow rate and pressure profiles for 1 to 4 axially alined orifice inlets
[NASA-TP-2460] N85-27185
PRESSURE EFFECTS
A numerical study of nonspherical black hole accretion N85-27760
PRESSURE GAGES
Detonation velocity measurements of the explosives Detasheet C and Amatol
[AD-A152298] N85-27015
A strain gauge manual
[AD-A151802] N85-27197
PRESSURE GRADIENTS
A four-field model for Tokamak plasma dynamics
[DE85-007111] N85-27694
PRESSURE OSCILLATIONS
Parametric study of autooscillation upon flow of supersonic jet into cylindrical cavity N85-27060
Atmospherically forced, coastally trapped, long period gravity waves off the south coast of southern Africa
N85-27461
PRESSURE PULSES
Flow dynamic environment data base development for the SSME N85-26885
PRESSURE RATIO
Optimum geometry of interblade passages in impellers of thermomolecular vacuum pump N85-27058
PRESSURE REDUCTION
A feasibility study for using low boiling point fluids to change aircraft tire deflection
[AD-A152096] N85-26701
A comprehensive strategy for saturation decompression with nitrogen-oxygen
[AD-A151800] N85-27520
PRESSURE SENSORS
An advanced solid state pressure transducer for high reliability SSME application N85-26905
PRESSURE WELDING
Solid state bonding of molybdenum and TZM
[BLL-T6439/BG/LRS/LRST751/85] N85-27220
PRESSURIZED WATER REACTORS
Information presentation in power plant control rooms
[VTT-320] N85-27668

PRETREATMENT
Influence of pretreatment, environment and strain rate on stress corrosion cracking of the aluminum alloy 7075-T6
[VTH-LR-433] N85-26985
PRIMERS
Development of acceptance criteria for batches of silane primer for external tank thermal protection system bonding applications
[NASA-CR-175850] N85-26995
PRIMITIVE EARTH ATMOSPHERE
Greenhouse effect in Earth's primordial atmosphere N85-27310
PRIMITIVE EQUATIONS
A split explicit model for short-term numerical weather prediction N85-27460
PRISMATIC BARS
Study on a prismatic dye vat --- laser systems
[CERT-2/6124-04-RO] N85-27217
PROBABILITY DENSITY FUNCTIONS
Measurement of damping of graphite epoxy materials
[NASA-CR-175793] N85-26925
A data based algorithm for choosing the window width when estimating the integral of f2(x)
[AD-A152093] N85-27553
PROBABILITY THEORY
The evolutive state: A new definition of system state to include sequencing of events N85-26643
A mathematical model for calculating detection probability of a diffusion target
[AD-A152026] N85-27601
An evaluation of discretized conditional probability and linear regression threshold techniques in model output statistics forecasting of visibility over the north Atlantic Ocean
[AD-A151955] N85-27619
Probabilistic algorithms in group theory
[AD-A152253] N85-27630
Refinements in the computation of collision probabilities
[DE85-006118] N85-27663
PROBLEM SOLVING
Finite-difference computations of rotor loads
[NASA-TM-86682] N85-26669
Method for evaluating perturbation in algorithms for solving navigational problems N85-26783
LU methods for the compressible Navier-Stokes equations N85-27160
Explicit construction of contractivity matrices
[TRITA-NA-8309] N85-27586
PROCEDURES
Guide for the execution of reliability tests in the laboratory --- aeronautical equipment N85-27237
PROCESS CONTROL (INDUSTRY)
Multivariable statistical modelling and its application N85-27617
PROCESSES
Studies of collisional and nonlinear radiative process for development of coherent UV and XUV sources
[AD-A152001] N85-27670
PROCUREMENT MANAGEMENT
Navy program manager's guide, 1985 edition
[AD-A151925] N85-27744
PRODUCT DEVELOPMENT
The development of onboard laser velocimeter at the Saint Louis Institute (France) from 1976 to 1982
[ISL-NB-402/83] N85-27216
Development of a Lagrangian drifting buoy N85-27338
PRODUCTION ENGINEERING
Manufacturing and producibility technology N85-26866
USSR report: Engineering and equipment
[JPRS-UEQ-84-006] N85-27035
Calculating reliability and productivity of cold stamping robot complex as queuing system N85-27039
Uses of laser technology described N85-27080
Manufacturing methods and technology CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) related efforts (FY 1980 - 1986)
[AD-A151817] N85-27547
PRODUCTION MANAGEMENT
Design-To-Cost (DTC) methodology to achieve affordable avionics N85-26645
PRODUCTIVITY
Calculating reliability and productivity of cold stamping robot complex as queuing system N85-27039
New stage in robotics development N85-27045
Design of computer-related workstations in relation to job functions and productivity
[AD-A151938] N85-27534
Management considerations for an information center
[AD-A151774] N85-27742
PROGRAM VERIFICATION (COMPUTERS)
The systematic integration of very large scale integrated circuit computer-aided design tools into a toolkit optimized for academic applications
[AD-A151813] N85-27538
PROGRAMMING (SCHEDULING)
Computer assisted flight schedule optimization
[AD-A151689] N85-27623
PROGRAMMING LANGUAGES
Graphic simulation of a machine-repairman model
[AD-A151761] N85-26633
The systematic integration of very large scale integrated circuit computer-aided design tools into a toolkit optimized for academic applications
[AD-A151813] N85-27538
Reliability models for dataflow computer systems
[NASA-CR-175813] N85-27543
Parallel computation of multiple-scale problems
[DE85-007230] N85-27563
Continued development and implementation of the Universal Network Interface Device (UNID) 2 in the Digital Engineering Laboratory Network (DELNET), volume 2
[AD-A151947] N85-27570
Internation information networks for material properties: Revision 1
[DE85-007412] N85-27572
PROJECT MANAGEMENT
Solid fuel combustion chamber
[VTH-LR-415] N85-26918
Organizing geological work tasks for 1985 outlined N85-27303
The Helios missions N85-27795
Managerial benefits of Helios for the European industry N85-27809
Helios project support N85-27812
PROJECT PLANNING
National Airspace System Plan: Facilities, equipment and associated development N85-26692
Space Station Engineering and Technology Development
[NASA-CR-175806] N85-26851
Organizing geological work tasks for 1985 outlined N85-27303
The significance of Helios for Europe N85-27808
PROJECTILES
Dispersion sensitivity of the eight inch advanced ramjet munitions technology projectile due to wind and minor thrust errors
[AD-A152145] N85-26835
Model for computing late detonations initiated in propellants by impact (XDT reactions)
[DE85-007377] N85-27019
Influence of behavior laws in the explosive deformation of metal plates
[ISL-R-122/83] N85-27032
A method for the evaluation of the residual energy of a metallic fragment after perforation of a thin target
[ISL-R-113/83] N85-27233
PROPELLANT GRAINS
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
Fiber reinforcement of gun propellant
[AD-A152296] N85-27014
PROPELLANTS
Design of a Mobile Combustion Diagnostic Fixture (MCDF)
[AD-A151814] N85-26941
PROPORTIONAL LIMIT
The effects of pin elasticity, clearance, and friction on the stresses in a pin-loaded orthotropic plate
[NASA-CR-175816] N85-26927
PROPULSION SYSTEM PERFORMANCE
Error reduction program --- combustor performance evaluation codes
[NASA-CR-174776] N85-27584
PROTECTIVE CLOTHING
Investigation of the requirement for auxiliary heating of Canadian forces personnel
[AD-A151950] N85-27522
PROTECTIVE COATINGS
Protective coatings for aircraft structures: A review
[VTH-LR-413] N85-26704
Effects of surface chemistry on hot corrosion life
[NASA-CR-174915] N85-26711
Material technology N85-26870
Characteristics of polyacrylic acid-complexed zinc phosphate conversion films deposited on metal surfaces
[DE85-004057] N85-26974
PROTOCOL (COMPUTERS)
Evaluation of Ada (trademark) as a communications programming language. Volume 2: Communications protocols application
[AD-A152315] N85-27560
Evaluation of Ada (trademark) as a communications programming language. Volume 3: Trusted software application
[AD-A152316] N85-27561
A study of topologies and protocols for fiber optic local area network
[NASA-CR-175771] N85-27669
PROTON BEAMS
Distortion functions
[DE85-007511] N85-27655
PROTONS
Spectral characteristics of protons at low and high altitudes during geomagnetic storm of 29 July 1977 N85-26786
Measurements of fluxes of high-energy protons and electrons by 2 oppositely oriented spectrometers aboard Cosmos-368 artificial Earth satellite N85-26800
PSEUDOMONAS
Structural-functional changes in bacterial cells under spaceflight conditions N85-26812
PSEUDORANDOM SEQUENCES
Efficient parallel pseudo-random number generation
[AD-A152235] N85-27608
PULSARS
Optical pulsar in the Large Magellanic Cloud remnant 0540-69.3
[DE85-006707] N85-27788
PULSE GENERATORS
Optically triggered transferred-electron device microwave burst and single pulse generators
[AD-D011614] N85-27141
Generalization of the Child-Langmuir relation for 1-dimensional time-dependent diodes
[DE85-007386] N85-27152
PULSE MODULATION
Pulsewidth modulated speed control of brushless dc motors
[AD-A151966] N85-27148
PULSE RADAR
Interference suppressor for radar MTI
[AD-D011606] N85-27086
PULSE RATE
A study of mode-locked argon ion-dye laser systems N85-27205
PULSED LASERS
Optogalvanic measurement of even parity Rydberg levels in krypton gas
[AD-A152113] N85-26943
A study of mode-locked argon ion-dye laser systems N85-27205
Surface modification of solids
[DE85-007543] N85-27715
Quantum statistical theory of vibrational dynamics in a laser-driven admolecule-surface system
[AD-A152022] N85-27719
PULSED RADIATION
Variations in intensity of secondary cosmic radiation observed on 10-11 August 1981 N85-26796
PULSES
Investigation of electron attachment and dissociation rates in C2F6/CH4 electric gas discharges
[AD-A151796] N85-27649
PUMP IMPELLERS
Optimum geometry of interblade passages in impellers of thermomolecular vacuum pump N85-27058
PUNCHES
Experience with introduction of Finish perforation of precision parts for optical instruments N85-27038
PUSHBROOM SENSOR MODES
INPE's line imaging camera: Preliminary results
[INPE-3476-PRE/719] N85-27194
Investigations of the accuracy of the Digital Photogrammetry System (DPS), a rigorous three-dimensional compilation process for pushbroom imagery
[MBB-UA-753/83-O] N85-27734
PYRIDINES
Evaluation of the PSP resin as a precursor of carbon
[ONERA-RT-11/1784-M] N85-26932
PYROELECTRICITY
Piezoelectric and pyroelectric polymers N85-27008
PYROLYSIS
Evaluation of the PSP resin as a precursor of carbon
[ONERA-RT-11/1784-M] N85-26932
PYROTECHNICS
Surveillance program for the dissection and analysis of explosive and pyrotechnic components
[DE85-006105] N85-27016
Short Wavelength Chemical Laser (SWCL) Workshop
[AD-A151959] N85-27211

Q

QUADRATIC EQUATIONS
Quadratic spaces over discrete Hodge algebras N85-27593

QUADRATIC PROGRAMMING
A decomposition procedure for convex quadratic programs
[AD-A151732] N85-27595

QUALITY CONTROL
Nondestructive tests of ceramic components for aircraft turbines N85-26718
Cost prediction model for various payloads and instruments for the Space Shuttle Orbiter
[NASA-CR-175781] N85-26842
A framework for software development
[AD-A152067] N85-27551
Lidar ER2 (ozone). Crystal characterization for harmonic conversion — laser systems
[CERT-2/6129-00] N85-27717

QUANTUM CHROMODYNAMICS
Discrete foundation for physics and experience
[DE85-008172] N85-27720
Configuration space Faddeev calculations
[DE85-005813] N85-27721

QUANTUM MECHANICS
Identification and properties of molecular systems of potential use in solar-pumped lasers
[NASA-CR-175804] N85-27207
Shallow impurity cluster states in n-type semiconductors
[INPE-3495-PRE/732] N85-27699
Discrete foundation for physics and experience
[DE85-008172] N85-27720
Configuration space Faddeev calculations
[DE85-005813] N85-27721
Mutil-particle quantum mechanics obeying fractional statistics
[DE85-007830] N85-27723

QUANTUM STATISTICS
Boson degrees of freedom in Fermion many-body systems
[DE85-006997] N85-27660
Spin-polerized quantum systems
[DE85-006914] N85-27667

QUANTUM THEORY
Eigenvalue approximation methods for quantum lattice Hamiltonians N85-27627
Quantum statistical theory of vibrational dynamics in a laser-driven admolecule-surface system
[AD-A152022] N85-27719

QUARKS
Overview of the physics issues at the SSC
[DE85-007074] N85-27634

QUARTZ
Method of fabricating acceleration resistant crystal resonators and acceleration resistant crystal resonators so formed
[AD-D011630] N85-27145
Acceleration sensitivity reduction method
[AD-D011631] N85-27146
Research and development of subsurface acoustic wave devices for sensor applications
[AD-A152197] N85-27642

QUEUEING THEORY
Calculating reliability and productivity of cold stamping robot complex as queuing system N85-27039

R

RADAR
Hardware test program for evaluation of baseline range-range rate sensor concept
[NASA-CR-175794] N85-27193

RADAR BEACONS
Development and flight test of a helicopter, X-band, portable precision landing system concept
[NASA-TM-86710] N85-26721

RADAR CROSS SECTIONS
Scattering center analysis for radar cross section modification N85-27085
An empirical self-protection chaff model
[AD-A151928] N85-27115
Radiation and scattering of spiral antennas
[AD-A151929] N85-27116

RADAR ECHOES
The use of radar in determining precipitation processes in the BEWMEX area N85-27455

RADAR GEOLOGY
Shuttle imaging radar-A (SIR-A) data analysis — geology of the Ozark Plateau of southern Missouri, land use in western Illinois, and vegetation types at Koonamore Station, Australia
[NASA-CR-175785] N85-27324

RADAR IMAGERY
Radar return from vegetation covered terrains
[INPE-3470-PRE/713] N85-27093
Synthetic aperture side-looking radar image adjustment N85-27304

RADAR NAVIGATION
Autofocus motion compensation for synthetic aperture radar and its compatibility with strapdown inertial navigation sensors on highly maneuverable aircraft
[AD-A151940] N85-26693

RADAR SCANNING
The development and application of volume scan and cell tracking capabilities for the analysis of convective cloud systems N85-27451

RADAR SCATTERING
Radiation and scattering of spiral antennas
[AD-A151929] N85-27116
Modeling the backscattering and transmission properties of vegetation canopies
[E85-10099] N85-27320

RADAR TRACKING
An empirical self-protection chaff model
[AD-A151928] N85-27115
Ziv-Zakai bound applied to an amplitude-comparison monopulse radar
[AD-A151937] N85-27118
A short range, high accuracy radar ranging system
[AD-A152195] N85-27122

RADIAL DISTRIBUTION
Inherent magnetic field error measurements in ELMO Bumpy Torus
[DE85-005855] N85-27685

RADIANT FLUX DENSITY
Screening ceramic materials for intense radiant heat applications
[DE85-006989] N85-27006

RADIATION BELTS
Substorms in energetic radiation belt particles according to data from Meteor artificial Earth satellite N85-26788

RADIATION COUNTERS
Photon detection with cooled avalanche photodiodes: Theory and preliminary experimental results N85-27096

RADIATION DISTRIBUTION
The physical interactions of radiofrequency radiation fields and biological systems N85-27129

RADIATION DOSAGE
Thermal consequences of localized SAR from RFR exposures N85-27130
The medical results of human exposures to radio frequency radiation N85-27133
Radio Frequency Radiation (RFR) measurements in operational settings N85-27138

RADIATION EFFECTS
USSR report: Space
[JPRS-USP-85-004] N85-26772
Satellite research on solar flares N85-26776
Swelling behavior of titanium-modified AISI 316 alloys
[DE85-007470] N85-26982
The Impact of Proposed Radio Frequency Radiation Standards on Military Operations
[AGARD-LS-138] N85-27128
The physical interactions of radiofrequency radiation fields and biological systems N85-27129
The biological effects of radiofrequency radiation N85-27131
The medical results of human exposures to radio frequency radiation N85-27133

RADIATION HARDENING
Radiation hardening for VLSI applications
[DE85-005493] N85-27155

RADIATION HAZARDS
The Impact of Proposed Radio Frequency Radiation Standards on Military Operations
[AGARD-LS-138] N85-27128
The biological effects of radiofrequency radiation N85-27131
The cumulative effects of long term exposure to low levels of radiofrequency radiation (RFR) N85-27132
Review of epidemiological studies of human exposures to radiofrequency radiation N85-27134
Hazards of VLF electromagnetic fields N85-27136
Development and application of new radiofrequency radiation safety standards N85-27137
The 10 MWe solar thermal central receiver pilot plant: Beam safety tests and analyses
[SAND-83-8035] N85-27379

RADIATION MEASURING INSTRUMENTS
Year-to-year variability of components of Earth's radiation budget according to satellite measurement data N85-26821

RADIATION PRESSURE
Numerical integration through force discontinuities: Solar radiation pressure N85-27298

RADIATION SPECTRA
The 10 MWe solar thermal central receiver pilot plant: Beam safety tests and analyses
[SAND-83-8035] N85-27379

RADIATION TRANSPORT
Intercomparison of Radiation Codes in Climate Models (ICRCCM)
[DE85-007251] N85-27487
Nonlinear DSA difference schemes for radiative transfer applications
[DE85-005729] N85-27611

RADIATIVE TRANSFER
Microwave model prediction and verifications for vegetated terrain
[E85-10102] N85-27322
Nonlinear DSA difference schemes for radiative transfer applications
[DE85-005729] N85-27611

RADICALS
Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935
A measurement of the vibrational band strength for the upsilon sub 3 band of the HO2 radical
[NASA-CR-175858] N85-26936
Cometary atmospheres: Modeling the spatial distribution of observed neutral radicals
[NASA-CR-175852] N85-27781

RADIO ANTENNAS
A description of the 64-meter antenna elevation drive gears and their strange wear N85-27107
Repair of the DSS-14 pedestal concrete N85-27108

RADIO ASTRONOMY
Radio observations of comet P/Crommelin
[INPE-3480-PRE/723] N85-27777
Calibration methods in millimeter-wave radioastronomy
[INPE-3481-PRE/724] N85-27778
The Helios radio astronomy experiment N85-27803

RADIO ATTENUATION
Results of simultaneous measurements of absorption and polarization of radio waves reflected from ionosphere N85-27313

RADIO COMMUNICATION
Survey of narrow band vocoder technology
[AD-A151919] N85-27114

RADIO EMISSION
Direct evidence for solar wind control of Jupiter's hectometer-wavelength radio emission
[NASA-TM-86073] N85-27790

RADIO EQUIPMENT
Application of space methods in geodesy N85-26817

RADIO FREQUENCIES
Switching mixer
[AD-D011602] N85-27139

RADIO FREQUENCY INTERFERENCE
Interference suppressor for radar MTI
[AD-D011606] N85-27086

RADIO NAVIGATION
Navigation: Accounting for copy N85-26841

RADIO SPECTRA
National Telecommunications and Information Administration authorization
[GPO-38-660] N85-27786

RADIO TRANSMISSION
Active and passive remote sensing of ice
[AD-A151741] N85-27369

RADIO TRANSMITTERS
Studies into location accuracy — ARGOS system N85-27334

RADIO WAVES
The Impact of Proposed Radio Frequency Radiation Standards on Military Operations
[AGARD-LS-138] N85-27128
The physical interactions of radiofrequency radiation fields and biological systems N85-27129
The biological effects of radiofrequency radiation N85-27131
The cumulative effects of long term exposure to low levels of radiofrequency radiation (RFR) N85-27132
Review of epidemiological studies of human exposures to radiofrequency radiation N85-27134
Hazards of VLF electromagnetic fields N85-27136
Radio Frequency Radiation (RFR) measurements in operational settings N85-27138

RADIOACTIVE DECAY
Neutrino measurements on the Moon
[DE85-007700] N85-27791

RADIOISOTOPE BATTERIES
LPCVD tungsten deposition on Si-Ge alloy
[DE85-005586] N85-26970

RADIOMETERS
Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms
[INPE-3359-PRE/637] N85-27545

RADIOSONDES
Lightweight aerological radiosonde MARZ N85-27309

RADON
Radon concentration inversion in the troposphere: Still unexplained
[INPE-3360-PRE/638] N85-27431
Atmospheric radon measurements in the Antarctic Penninsula: A preliminary report
[INPE-3398-PRE/667] N85-27436

RAILGUN ACCELERATORS
Spectroscopic studies of a railgun muzzle flash
[MRL-R-952] N85-26837
Metal armatures for railguns
[AD-A152129] N85-26838

RAIN
EHF attenuation derived from emission temperatures in light rain
[AD-A151166] N85-27110
On the 1963 drought in northeast Brazil
[INPE-3412-PRE/678] N85-27476
An appraisal of the duration of the recent drought in northeast Brazil and a forecast for 1985
[INPE-3477-PRE/720] N85-27478

RAINMAKING
SCPP (Sierra Cooperative Pilot Project) Forecasting Support N85-27493

RAMAN SPECTRA
Fiber optic Raman thermometer for Space Shuttle main engine preburner profiling N85-26904

RAMJET ENGINES
Dispersion sensitivity of the eight inch advanced ramjet munitions technology projectile due to wind and minor thrust errors
[AD-A152145] N85-26835
Solid fuel combustion chamber research in the Netherlands
[VTH-LR-444] N85-26920

RANDOM ACCESS MEMORY
Parallel time 0(log N) acceptance of deterministic CFLs
[AD-A152255] N85-27539

RANDOM NOISE
Measurement of damping of graphite expoxy materials
[NASA-CR-175793] N85-26925
Robust detection of fading narrow-band signals in non-Gaussian noise
[AD-A152262] N85-27124

RANDOM NUMBERS
Efficient parallel pseudo-random number generation
[AD-A152235] N85-27608
Probabilistic algorithms in group theory
[AD-A152253] N85-27630

RANDOM WALK
Laser gyroscope random walk determination using a fast filtering technique N85-26647

RANGE AND RANGE RATE TRACKING
Hardware test program for evaluation of baseline range-range rate sensor concept
[NASA-CR-175794] N85-27193
Optimal relative data weights N85-27296

RANGEFINDING
A short range, high accuracy radar ranging system
[AD-A152195] N85-27122

RANKINE CYCLE
Analysis of alkali liquid metal Rankine space power systems
[DE85-005089] N85-26917

RAPID QUENCHING (METALLURGY)
Investigation of the pitting potential of rapidly solidified aluminum-lithium alloys
[VTH-LR-434] N85-26986

RARE EARTH ELEMENTS
Microscopic analysis of angular momentum projected HFB-states in terms of interacting bosons
[DE85-007629] N85-27661

RAREFIED GAS DYNAMICS
Study of stresses on surface of flat barrier immersed in under expanded jet of rarefied gas N85-27061

RATS
Preliminary assessment of climatic change during late Wisconsin time, southwest Great Basin and vicinity, Arizona, California and Nevada
[DE85-008343] N85-27488
Does a 50-cycle alternating field have central nervous effects?
[BLL-CE-TRANS-8063-(9022.09)] N85-27507
Experiments in microwave exposure in the rat: Body temperature, serum chemistry and the use of chemical restraint
[PB85-156834] N85-27512

RAWINSONDES
Upper-air data collection during CAPTEX
[DE85-006300] N85-27438

RAY TRACING
LIGHT: A ray tracing code to simulate light collection in scintillation spectrometers and light pipes
[DE85-007213] N85-27673

RAYLEIGH WAVES
Inversion of Rayleigh wave group velocities from high-explosive tests
[AD-A152172] N85-27175

REACTION KINETICS
The overall reaction concept in premixed, laminar, steady-state flames. 2: Initial temperatures and pressures
[AD-A152132] N85-26944
Transitional metal activation and functionalization of C-H bonds
[DE85-006816] N85-26949
Evaluation of chemical reaction mechanisms for photochemical smog. Part 2: Quantitative evaluation of the mechanisms, revised
[PB85-166080] N85-27408

REACTION PRODUCTS
Identification and properties of molecular systems of potential use in solar-pumped lasers
[NASA-CR-175804] N85-27207

REACTION TIME
Shape with and without redundant colour as coding mechanism for simulated radar displays in a time-extended simple vigilance task
[AD-A151683] N85-27533

REACTOR DESIGN
Swelling behavior of titanium-modified AISI 316 alloys
[DE85-007470] N85-26982
Ballooning beta limits of dee and bean shaped Tokamaks
[IPPJ-713] N85-27676
TOKASTAR: A Tokamak stellarator hybrid with possible bean-shaped operation
[IPPJ-718] N85-27680
Fusion-power-core design of a Compact Reversed-Field Pinch Reactor (CRFPR)
[DE85-007710] N85-27692

REACTOR PHYSICS
Refinements in the computation of collision probabilities
[DE85-006118] N85-27683

REAGENTS
A robotic system for preparing reagent and dilution vials
[DE85-008262] N85-27231

REAL TIME OPERATION
Graphic simulation of a machine-repairman model
[AD-A151761] N85-26633
Maintaining consistency and accommodating network repair in a self-regenerative distributed database management system (a discussion of the means and cost) N85-26656
Design and specification of a local area network architecture for use in real-time flight simulation
[AD-A152242] N85-26762
Implementation of a real-time, interactive, continuous speech recognition system
[AD-A151936] N85-27117

REAL VARIABLES
Schubert varieties are arithmetically Cohen-Macaulay N85-27592

REATTACHED FLOW
An experimental study of compressible turbulent reattaching free shear layers N85-27161

RECEIVERS
Photon detection with cooled avalanche photodiodes: Theory and preliminary experimental results N85-27096

RECHARGING
Sixth DOE Electrochemical Contractor's Review. Extended abstracts
[DE84-013679] N85-27151

RECIRCULATIVE FLUID FLOW
Confined turbulent swirling recirculating flow predictions
[NASA-CR-174917] N85-26716

RECOMBINATION REACTIONS
Heavy doping effects in high efficiency silicon solar cells
[NASA-CR-175779] N85-27383
Role and fate of ozone in the atmosphere N85-27421

RECURSIVE FUNCTIONS
A general simulation program for robot manipulator arm dynamics
[AD-A152121] N85-27230

REDOX CELLS
Cycling performance of the iron-chromium redox energy storage system
[NASA-TM-87034] N85-27387

REDUCED GRAVITY
Microgravity: A new tool for basic and applied research in space
[EP-212] N85-26767

REDUCTION
Life and reliability modeling of bevel gear reductions
[NASA-TM-87006] N85-27227

REDUNDANCY
Some flight test results with redundant digital flight control systems N85-26739
A modular dissimilar redundant computer designed for high integrity control N85-26751

REFINING
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe
[NASA-CR-174840] N85-27012

REFLECTANCE
Heliocentric sail problem with variable gravity field reduction N85-26816
Effects of temperature on remotely sensed mafic mineral absorption features N85-27323

REFLECTION
Use of Goudrian model in studying laws of reflection in vegetation-soil system in optical range. 2: Influence of illumination conditions on spectral brightness coefficients N85-26827
Energy reflection coefficient for H+ ions at energies between 10 and 80 keV
[DE85-007547] N85-27662
LIGHT: A ray tracing code to simulate light collection in scintillation spectrometers and light pipes
[DE85-007213] N85-27673

REFRACTION
Inversion of Rayleigh wave group velocities from high-explosive tests
[AD-A152172] N85-27175
Astrometric method advances Astronomy, geodesy N85-27306

REFRACTIVITY
The problem of atmospheric turbulence
[NASA-CR-175783] N85-27464
LIGHT: A ray tracing code to simulate light collection in scintillation spectrometers and light pipes
[DE85-007213] N85-27673

REFRACTORY MATERIALS
Method of fabricating material for the electrodes of gas discharge devices
[DE85-007452] N85-27157

REFRIGERATORS
Photovoltaic powered vaccine refrigerator-freezer systems field test results
[NASA-TM-86972] N85-27386

REGRESSION ANALYSIS
Statistical regularization methods in problem of navigational determination of space vehicle orbits N85-26784
Multiple regression analysis of photographic image of soil properties N85-26825
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology
[AD-A151956] N85-27548
Some new estimation methods for weighted regression when there are possible outliers
[AD-A152104] N85-27602
Locally-weighted-regression scatter-plot smoothing (LOWESS): A graphical exploratory data analysis technique
[AD-A152239] N85-27609
An evaluation of discretized conditional probability and linear regression threshold techniques in model output statistics forecasting of visibility over the north Atlantic Ocean
[AD-A151955] N85-27619
Local likelihood estimation
[DE85-007238] N85-27620

REGULATIONS
White paper on new international satellite systems
[PB85-162501] N85-27127

REGULATORS
Some new results on the discrete-time Riccati Equation and their use in the design of optimal regulators and observer-estimators
[AD-A151934] N85-27597

REINFORCING MATERIALS
Particulate and whisker toughened alumina composites
[DE85-005239] N85-26930

RELATIVISTIC ELECTRON BEAMS
Bursts of relativistic electrons in magnetopause and in outer radiation belt N85-26801

RELIABILITY
The evolutive state: A new definition of system state to include sequencing of events N85-26643

Avionics integrity issues presented during NAECON (National Aerospace and Electronics Convention) 1984
[AD-A151923] N85-26707
Technical evaluation report on the Flight Mechanics Symposium on Active Control Systems: Review, Evaluation and Projections
[AGARD-AR-220] N85-26730
Active control technology: Past, present, future N85-26731
Initial quality of advanced joining concepts
[AD-A152241] N85-27027
Research on products obtained by powder metallurgy N85-27081
Life and reliability modeling of bevel gear reductions
[NASA-TM-87006] N85-27227
Photovoltaic cell reliability research: Investigation of accelerated stress factors and failure-degradation mechanisms in terrestrial solar cells
[NASA-CR-175815] N85-27388

RELIABILITY ANALYSIS
Cost prediction model for various payloads and instruments for the Space Shuttle Orbiter
[NASA-CR-175781] N85-26842
Calculating reliability and productivity of cold stamping robot complex as queuing system N85-27039
Determining availability characteristics of DSN data systems using discrepancy report data N85-27109
Fatigue criterion to system design, life and reliability
[NASA-TM-87017] N85-27226
Extreme evaluation of reliability indices for components of metallurgical equipment
[BLL-M-36070-(5828.4)] N85-27234
An abstract specification language for Markov reliability models
[NASA-TM-86423] N85-27616

RELIABILITY ENGINEERING
Guide for the execution of reliability tests in the laboratory — aeronautical equipment N85-27237
Characterization of solderless miniwrapping connections
[CNES-NT-112] N85-27238

RELOCATION
An inexpensive radar-responding relocation device for drifting oceanographic instruments
[AD-A152170] N85-27505

REMOTE CONTROL
Optimal open loop and nonlinear feedback control for remote orbital capture
[AD-A151967] N85-26859

REMOTE SENSING
Tenth Conference of Working Group of Socialist Countries on Remote Sensing of Earth under Intercosmos Program N85-26820
One approach to remote sensing of total ozone content N85-26822
Scheme for atmospheric thermal sensing from satellites with enhanced vertical resolution N85-26823
Multiple regression analysis of photographic image of soil properties N85-26825
Contribution to space program reviewed N85-26834
Radar return from vegetation covered terrains
[INPE-3470-PRE/713] N85-27093
The Bresex multispectral camera: Preliminary characteristics
[INPE-3424-PRE/687] N85-27195
China's integrated circuit production N85-27302
Study of the urban evolution of Brasilia with the use of LANDSAT data
[E85-10101] N85-27321
Simultaneous Earth observations from 2 satellites
[NASA-TM-86204] N85-27325
System of interpretation of remote sensing data when hydrocarbons are present, volume 2
[INPE-3067-TDL/162-VOL-2] N85-27326
SELPER (Latin American Society of Remote Sensory Specialists)
[INPE-3315-PRE/622] N85-27328
Function of remote sensing in Brazil
[INPE-3314-PRE/621] N85-27329
The relevance of remote sensing to Brazil
[INPE-3421-PRE/686] N85-27332
Utilization of remote sensing data in the evaluation of air pollution characteristics in the south coast/Southeast Desert Air Basin
[PB85-162063] N85-27407
In-situ stratospheric ozone measurements: Recent results and their implications N85-27419
SAM II measurements of the polar stratospheric aerosol. Volume 6: April to October 1981
[NASA-RP-1141] N85-27422
Ground-based remote sensing of atmospheric pollution N85-27462
Atmospheric frontal zone studies
[NASA-CR-175293] N85-27469
Experience of the Institute of Space Research with the use of remote sensing in urban planning studies
[INPE-3159-PRE/533] N85-27770
Remote sensing of the plasma with time delay measurements (coronal sounding) N85-27804
Solar activity monitoring satellite (SAMSAT): Impact on space environment services
[PB85-165066] N85-27818

REMOTE SENSORS
The remote detection of polynuclear aromatic hydrocarbons using laser-induced fluorescence
[AD-A152294] N85-27013
Active and passive remote sensing of ice
[AD-A151741] N85-27369
A transduction path method of solid state sensor analysis and investigation
[AD-A152123] N85-27707

REMOTELY PILOTED VEHICLES
The PINGUIN B3: A remotely piloted vehicle for mine identification and disposal
[MBB-UM-1/84-O] N85-27735

REPLENISHMENT
A replenishment phase study for the NAVSTAR global positioning system
[AD-A152030] N85-26695

REQUIREMENTS
Technical overview structural dynamics N85-26883

RESEARCH
Recent Naval Postgraduate School publications
[AD-A151723] N85-27740

RESEARCH AND DEVELOPMENT
Flight testing and development of the F/A-18A digital flight control system N85-26743
East Europe report: Science and technology
[JPRS-ESA-84-032] N85-26833
Research and development. Technical and scientific reports 1984 N85-27724
NBS (National Bureau of Standards) research reports
[PB85-127421] N85-27764

RESEARCH FACILITIES
Ignition of metals in high pressure oxygen N85-26874
A summary of the Naval Postgraduate School research program
[AD-A151721] N85-27738

RESEARCH PROJECTS
Space Station Spartan study
[NASA-TM-86215] N85-26852

RESIDENTIAL ENERGY
A multifunction wall system for application with solar heating and ground cooling
[DE85-006792] N85-27395

RESIDUAL STRESS
Mechanical properties of high performance carbon fibers N85-26922
Study of oscillations of composite cylindrical shells using a dynamic stiffness technique N85-27066
Stressed-strained state of tubular shells under uniformly distributed pressure N85-27067
On residual stress in an elastic body N85-27248
Principles of wave formation along web of H-beams
[BLL-M-36041-(5828.4)] N85-27253
An X-ray study of residual stresses in narrow groove TIG weldments
[DE85-006485] N85-27274

RESIN MATRIX COMPOSITES
NASA/aircraft industry standard specification for graphite fiber toughened thermoset resin composite material
[NASA-RP-1142] N85-26923
Characterization-curing-property studies of HBRF 55A resin formulations
[NASA-CR-175836] N85-26989

RESONANCE
Pyrotechnic shock simulation using the controlled response of a resonating bar fixture
[DE85-006537] N85-27181
Distortion functions
[DE85-007511] N85-27655

RESONANT FREQUENCIES
Approximate solution of the problem of fluid oscillations in cavities of revolution N85-27056

RESONANT VIBRATION
Turbine blade friction damping study N85-26886

RESONATORS
Suppression of vibration effects on piezoelectric crystal resonators
[AD-D011625] N85-27142
Acceleration-resistant crystal resonator
[AD-D011627] N85-27144
Method of fabricating acceleration resistant crystal resonators and acceleration resistant crystal resonators so formed
[AD-D011630] N85-27145
Acceleration sensitivity reduction method
[AD-D011631] N85-27146

RESOURCE ALLOCATION
Glossary of landscape and vegetation ecology for Alaska
[PB85-153831] N85-27372

RESPIRATION
Hazards in welding due to oxygen changes in the workplace atmosphere
[BLL-WI-TRANSL-684-(9312.57)] N85-27224

RESPONSE TIME (COMPUTERS)
Development of graphical time response using the OPTSYSX program
[AD-A152221] N85-27557

RESPONSES
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology
[AD-A151956] N85-27548

RETARDING
Suppression of vibration effects on piezoelectric crystal resonators
[AD-D011625] N85-27142
Dual species ion implantation of ternary compounds based on In-Ga-As
[AD-D011617] N85-27698

REUSE
Reusable software: A concept for cost reduction N85-26855

REVERSE FIELD PINCH
Poloidal rotation of magnetic fluctuations in reversed field pinch plasma
[IPPJ-715] N85-27677
Fusion-power-core design of a Compact Reversed-Field Pinch Reactor (CRFPR)
[DE85-007710] N85-27692

REVISIONS
Testing of scanner-assisted revision of the topographic map 1:25,000 (TK 25) N85-27359
Automatic engraving of map frames in the revision of the TK 25, 1:25,000 topographical map N85-27362
A concept for map updating using digital image processing methods N85-27364

RHENIUM ALLOYS
Solution softening in molybdenum-rhenium alloys
[DE85-006706] N85-26972

RIBS (SUPPORTS)
Research in the field of rib stiffened shell stability N85-27068

RICCATI EQUATION
Some new results on the discrete-time Riccati Equation and their use in the design of optimal regulators and observer-estimators
[AD-A151934] N85-27597

RIEMANN MANIFOLD
Conditions for the possibility of conformal sewing
[ST-AASF-IMD-58] N85-27625

RIGID STRUCTURES
An improved torsional method for determining the fracture toughness of stiff materials and of adhesive joints
[AD-A152091] N85-27267

RINGS (MATHEMATICS)
Quadratic spaces over discrete Hodge algebras N85-27593

RIVETED JOINTS
The application of BRILES rivets for mechanical jointing of Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-387] N85-27279
Mechanical jointing in Aramid fiber composites: An experimental study
[VTH-LR-371] N85-27280

RIVETING
The application of BRILES rivets for mechanical jointing of Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-387] N85-27279
Utilization of an automated riveting system in aircraft construction
[MBB-UT-11/84-O] N85-27736

RIVETS
The application of BRILES rivets for mechanical jointing of Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-387] N85-27279

ROBOTICS
East Europe report: Science and technology
[JPRS-ESA-84-032] N85-26833
Optimal open loop and nonlinear feedback control for remote orbital capture
[AD-A151967] N85-26859
Method of selecting robotized system design for pressing process N85-27040
Experience of sheet stamping robotic complexes N85-27041
USSR report: Machine tools and metalworking equipment
[JPRS-UMM-84-010] N85-27071

New robotized, vertical broaching machine featured N85-27074
Guidelines for optimization of robotized machining cells N85-27076
A robotic system for preparing reagent and dilution vials
[DE85-008262] N85-27231

ROBOTS
Structural design and kinematic configuration of two-armed robots N85-27037
Calculating reliability and productivity of cold stamping robot complex as queuing system N85-27039
Automatic manipulators for forging rollers N85-27042
Updating model RPD-1.25 industrial robot N85-27043
Industrial robots and automatic manipulators for forging and pressing operations at Second International Exhibition N85-27044
New stage in robotics development N85-27045
Control of motion of manipulator robots on basis of first-order kinematic algorithms N85-27047
Robotic thermal battery pellet fabrication
[DE85-007755] N85-27154
Creating a Mobile Autonomous Robot Research System (MARRS)
[AD-A151963] N85-27229
A general simulation program for robot manipulator arm dynamics
[AD-A152121] N85-27230
Kinematic rate control of simulated robot hand at or near wrist singularity
[NASA-TP-2440] N85-27575
Positioning of a robotic manipulator through the use of visual feedback
[AD-A151933] N85-27577

ROBUSTNESS (MATHEMATICS)
Robust detection of fading narrow-band signals in non-Gaussian noise
[AD-A152262] N85-27124

ROCKET ENGINES
Ion sensor signal fluctuations during operation of spacecraft reaction engines N85-26815
Liquid rocket combustor computer code development N85-26910
Model for computing late detonations initiated in propellants by impact (XDT reactions)
[DE85-007377] N85-27019

ROCKET PROPELLANTS
Model for computing late detonations initiated in propellants by impact (XDT reactions)
[DE85-007377] N85-27019

ROCKET SOUNDING
Experimental research on ionospheric disturbance caused by cumulative barium vapor injection N85-26787
Observations of airglow O2(1-Sigma) atmospheric band at 8645 A and the rotational temperature at 23 deg S
[INPE-3378-PRE/653] N85-27435

ROCKET THRUST
Ion sensor signal fluctuations during operation of spacecraft reaction engines N85-26815

ROCKS
In-situ rock melting applied to lunar base construction and for exploration drilling and coring on the moon
[DE85-006716] N85-26770
Analysis of mesofissuring on space photographs: New technique for study of petroleum and gas deposits N85-26828

ROLL FORMING
Automatic manipulators for forging rollers N85-27042
Principles of wave formation along web of H-beams
[BLL-M-36041-(5828.4)] N85-27253

ROLLING MOMENTS
Operational and developmental experience with the F/A-18A digital flight control system N85-26742

ROOM TEMPERATURE
Temperature: Curvature relationships for unsymmetric graphite-epoxy laminates
[VPI-E-85-06] N85-26926
Effects of temperature on remotely sensed mafic mineral absorption features N85-27323
A study of Ga(.47)In(.53)As and Al(.48)In(.52)As for very high frequency device applications
[AD-A151995] N85-27706

ROSS ICE SHELF
Microbial ecology of extreme environments: Antarctic yeasts and growth in substrate-limited habitats
[NASA-CR-175810] N85-27509

ROSSBY REGIMES
Study of the functions of similarity of the planetary boundary layer. Part 1: Theory
[INPE-3129-PRE/520-PT-1] N85-27426

ROTARY STABILITY
Damping seals for turbomachinery N85-26894
Housing flexibility effects on rotor stability N85-26896

ROTARY WINGS
Rotor blade flap-lag stability and response in forward flight in turbulent flows N85-26698

ROTATING BODIES
Optimum rotation of solid body with 1 axis of symmetry N85-26781
Nonlinear equations for dynamics of pretwisted beams undergoing small strains and large rotations
[NASA-TP-2470] N85-27258

ROTATING CYLINDERS
Flow around rotating and nonmoving circular cylinder near flat screen. Report 1: Aerodynamic forces in cylinder N85-27059

ROTATING FLUIDS
Solution of Onsager's equation for a rotating compressible fluid in a multiply-connected domain
[DE85-007048] N85-27178

ROTATING SHAFTS
An analytical investigation of dynamic coupling in nonlinear, geared rotor systems N85-27218

ROTATION
Damping seals for turbomachinery N85-26894
Poloidal rotation of magnetic fluctuations in reversed field pinch plasma
[IPPJ-715] N85-27677

ROTOR AERODYNAMICS
Finite-difference computations of rotor loads
[NASA-TM-86682] N85-26669
Vibration characteristics of the HPOTP (High Pressure Oxygen Turbopump) of the SSME (Space Shuttle Main Engine) N85-26895
Housing flexibility effects on rotor stability N85-26896

ROTOR BLADES (TURBOMACHINERY)
Development of a rotor wake-vortex model, volume 1
[NASA-CR-174849] N85-26668
Aerodynamic detuning analysis of an unstalled supersonic turbofan cascade
[NASA-TM-87001] N85-26670

ROTOR SPEED
Development of a rotor wake-vortex model, volume 1
[NASA-CR-174849] N85-26668

ROTORS
Rotordynamics N85-26888
Effects of bearing deadbands on bearing loads and rotor stability N85-26889
Rotor response for transient unbalance changes in a nonlinear simulation N85-26892
Damping seals for turbomachinery N85-26894
Vibration characteristics of the HPOTP (High Pressure Oxygen Turbopump) of the SSME (Space Shuttle Main Engine) N85-26895
Reusable rocket engine turbopump condition monitoring N85-26907
An analytical investigation of dynamic coupling in nonlinear, geared rotor systems N85-27218

RUNWAY LIGHTS
Radioluminescent lighting for rural Alaskan runway lighting and marking
[DE85-007022] N85-26764
Acceptability testing of radioluminescent lights for VFR-night air taxi operations
[DE85-007303] N85-26765

RUNWAYS
Probabilistic computer model of optimal runway turnoffs
[NASA-CR-172549] N85-26760
Study of acceptance criteria for joint densities in bituminous airport pavements
[FAA-PM-85-5] N85-26761

S

SABOT PROJECTILES
Metal armatures for railguns
[AD-A152129] N85-26838

SADDLE POINTS
Analysis of the convergence of mixed finite element methods
[HTKK-MAT-A227] N85-27613

SAFETY
Some aspects of how to design cost-effective flight control systems N85-26639
The certification of airborne complex digital systems N85-26754
A review of safety practices and safety training for the explosives field
[AD-A152295] N85-27028

SAFETY DEVICES
Parachute extraction device for ultralight gliders
[CH-643499-A5] N85-26663
Torso restraint system
[AD-D011609] N85-26684

SAFETY FACTORS
Development and application of new radiofrequency radiation safety standards N85-27137

SAILS
La Recherche Aerospatiale Bimonthly Bulletin, Number 1984-4, 221/July-August
[ESA-TT-884] N85-26637

SALYUT SPACE STATION
USSR report: Space
[JPRS-USP-85-004] N85-26772
Tass reports program for Salyut-7 fully completed N85-26773
Cosmonaut Savitskaya says many women in cosmonaut training N85-26774

SAMPLERS
New stage in robotics development N85-27045
Acid rain: Towards automated monitoring N85-27444

SAMPLING
Multivariable statistical modelling and its application N85-27617

SANDS
Experimentally determined distribution of stress around a horizontally loaded model pile in dense sand
[CE-43] N85-27239

SANDWICH STRUCTURES
Stability of anisotropic cylindrical sandwich shells N85-27065

SATELLITE ANTENNAS
Earth station antenna sidelobe characteristics
[PB85-164986] N85-27159

SATELLITE ATMOSPHERES
A modeling analysis program for the JPL table mountain lo sodium cloud
[NASA-CR-175851] N85-27468

SATELLITE ATTITUDE CONTROL
Optimum parameters of aerogyroscopic satellite orientation system N85-26782

SATELLITE CONFIGURATIONS
A study of spacecraft technology and design concepts, volume 1
[NASA-CR-172579-VOL-1] N85-26844
A study of spacecraft technology and design concepts. Volume 2: Appendices
[NASA-CR-172579-VOL-2] N85-26845
Spacecraft configuration study for second generation mobile satellite system
[NASA-CR-175774] N85-26849

SATELLITE DOPPLER POSITIONING
DORIS: Prediction in Doppler measurement — satellite onboard measurement
[CNES-CT/DTI/MS/AE/170] N85-26843
Data Collection and Platform Location by Satellite: ARGOS Users' Conference N85-27333
Studies into location accuracy — ARGOS system N85-27334
Positioning accuracy of the ARGOS system in operational use N85-27335
Checking on the position of navigation marker buoys by the ARGOS system N85-27354
Location and data collection satellite system ARGOS. User's guide — satellite based localization N85-27371
Influence of coherent mesoscale structures on satellite-based Doppler lidar wind measurements
[NASA-CR-175853] N85-27467

SATELLITE DRAG
Optical best arc RMS test results N85-27290

SATELLITE GROUND TRACKS
Comparison of gravity field solution techniques N85-27295

SATELLITE IMAGERY
Identification of structure of soil-vegetation cover using aerial and space photographs N85-26826
Contribution to space program reviewed N85-26834
China's integrated circuit production N85-27302
CNPq/INPE LANDSAT system: Report of activities from October 1, 1983 to September 30, 1984 — Brazil
[E85-10097] N85-27318
Noise correction on LANDSAT images using a spline-like algorithm
[E85-10098] N85-27319
The relevance of remote sensing to Brazil
[INPE-3421-PRE/686] N85-27332
Experience of the Institute of Space Research with the use of remote sensing in urban planning studies
[INPE-3159-PRE/533] N85-27770

SATELLITE INSTRUMENTS
French and West German equipment for Vega Project N85-26805

SATELLITE NETWORKS
White paper on new international satellite systems
[PB85-162501] N85-27127
Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance N85-27344

Present stage of utilization of the ARGOS system by the ORSTOM hydrological service for hydrometric data collection N85-27348
The ARGOS system in Brazil — hydrology N85-27349
A seismic ARGOS data collection platform N85-27350
An operational buoy network collecting meteorological data N85-27351
Operational experiences with the ARGOS system in Greenland N85-27353

SATELLITE OBSERVATION
Year-to-year variability of components of Earth's radiation budget according to satellite measurement data N85-26821
Gravity model development software status N85-27289
Atmospheric frontal zone studies [NASA-CR-175293] N85-27469
Solar activity monitoring satellite (SAMSAT): Impact on space environment services [PB85-165066] N85-27818

SATELLITE ORBITS
Statistical regularization methods in problem of navigational determination of space vehicle orbits N85-26784
Satellite physical and orbital characteristics N85-27287
Radial orbit error spectrum for Topex N85-27292

SATELLITE PERTURBATION
Accuracy in predicting orbital motion of artificial Earth satellite N85-26793
Satellite selection criteria N85-27288

SATELLITE SOUNDING
Substorms in energetic radiation belt particles according to data from Meteor artificial Earth satellite N85-26788
Determining effective rate of plasma heating in outer equatorial ionosphere using data from ISIS-1 and ISIS-2 satellites N85-26797
The validation of sea surface temperatures determined from AVHRR data using in situ data recovered via system ARGOS N85-27342
Assessment of VAS soundings in the analysis of a preconvective environment [NASA-TM-86205] N85-27427
Remote sensing of the plasma with time delay measurements (coronal sounding) N85-27804

SATELLITE TRACKING
Data Collection and Platform Location by Satellite: ARGOS Users' Conference N85-27333
Long term drifting float for measuring mean oceanic circulation using ARGOS system N85-27339
Results of an initial trial of a satellite telemetering buoy measuring near surface current N85-27345
The ARGOS system used for tracking gray whales N85-27347

SATELLITE TRANSMISSION
SESC (Space Environment Services Center) satellite broadcasting 10-year plan [PB85-163541] N85-27126
Station for in-orbit testing of satellites [MBB-UR-708/84-O] N85-27733

SATELLITE-BORNE PHOTOGRAPHY
Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and photomaps N85-26829

SATURATION
A comprehensive strategy for saturation decompression with nitrogen-oxygen [AD-A151600] N85-27520

SATURN ATMOSPHERE
Possible period of Jovian activity and possibility of seasons N85-26810

SCATTERING COEFFICIENTS
Test of lidar inversion algorithm sensitivity to atmospheric backscatter and extinction parameters, revision A [AD-A152082] N85-27671

SCATTERING CROSS SECTIONS
Theory of electron-impact atomic ionization cross sections [AD-A151763] N85-27648

SCATTERING FUNCTIONS
Multiple scattering of electromagnetic waves in discrete random media [AD-A151786] N85-27112

SCENE ANALYSIS
Validation of the ERBE scanner scene identification methodology: Analysis with Nimbus-7 ERB data [NASA-CR-172595] N85-27466
Scene analysis using recursive frequency domain correlation with energy normalization [AD-A151777] N85-27596

SCHOOLS
Recent Naval Postgraduate School publications [AD-A151723] N85-27740

SCHROEDINGER EQUATION
Computer modeling of vibrational energy levels of potential laser candidates (diatomic molecules) [AD-A151765] N85-27209

SCIENTISTS
Institute's contribution to Soviet welding technology noted N85-27072
Span graphics display utilities handbook, first edition [NASA-TM-86500] N85-27567

SCINTILLATION
Remote sensing of irregularities in the equatorial ionosphere using the radio scintillation technique N85-27317

SCINTILLATION COUNTERS
LIGHT: A ray tracing code to simulate light collection in scintillation spectrometers and light pipes [DE85-007213] N85-27673

SEA BREEZE
Air flow of the western coastal boundary of South Africa and its influence on the ocean N85-27459

SEA ICE
Active and passive remote sensing of ice [AD-A151741] N85-27369

SEA LEVEL
The sea level response to weather along the coast of southern Africa N85-27446

SEA SURFACE TEMPERATURE
China's integrated circuit production N85-27302
The validation of sea surface temperatures determined from AVHRR data using in situ data recovered via system ARGOS N85-27342

SEALS (ANIMALS)
Motivation for satellite tracking of southern elephant seals Mirounga leonina at sea N85-27346

SEALS (STOPPERS)
Damping seal verification setup N85-26893
Damping seals for turbomachinery N85-26894

SEAMS (JOINTS)
Study of acceptance criteria for joint densities in bituminous airport pavements [FAA-PM-85-5] N85-26761

SEARCH PROFILES
Retrieval performance in a full text journal article database N85-27747

SEARCHING
Forward library searching of previously-quantitated peaks, using a scan list created from a quantitation list by a novel FORTRAN program for the INCOS data system [PB85-165835] N85-27541

SEAT BELTS
Improving inflight negative Gz restraint for aircrewmen [AD-A151909] N85-26688

SECONDARY COSMIC RAYS
Variations in intensity of secondary cosmic radiation observed on 10-11 August 1981 N85-26796

SEISMOGRAPHS
A seismic ARGOS data collection platform N85-27350

SEISMOLOGY
A seismic ARGOS data collection platform N85-27350
Response of a wind turbine blade to seismic and turbulent wind excitations N85-27375
Symposium on Atmospheric Sciences in South Africa [CSIR-S-331] N85-27442
Born inversion with a stratified reference velocity [AD-A149222] N85-27594

SELECTION
Method of selecting robotized system design for pressing process N85-27040
Satellite selection criteria N85-27288

SELENOLOGY
Surface exploration geophysics applied to the Moon [DE85-006714] N85-27793

SELF ADAPTIVE CONTROL SYSTEMS
Technical evaluation report on the Flight Mechanics Symposium on Active Control Systems: Review, Evaluation and Projections [AGARD-AR-220] N85-26730

SELF OSCILLATION
Parametric study of autooscillation upon flow of supersonic jet into cylindrical cavity N85-27060

SEMANTICS
Research in knowledge representation for natural language understanding [AD-A152260] N85-27579

SEMICONDUCTOR DEVICES
Space power plants N85-26813
Cryostat and electronic development associated with multi-detector spectrometer systems [DE85-007624] N85-27203
Shallow impurity cluster states in n-type semiconductors [INPE-3495-PRE/732] N85-27699

SEMICONDUCTOR JUNCTIONS
Flat-plate solar array project process development area: Process research of non-CZ silicon material [NASA-CR-175777] N85-27382

SEMICONDUCTORS (MATERIALS)
The impact of VLSI on guidance and control system design N85-26854
Periodic cluster simulation of a disordered impurity system [INPE-3453-PRE/705] N85-27628
On some physical impurity properties of doped-indirect gap semiconductors at low and intermediate concentrations [INPE-3452-PRE/704] N85-27701
Density of impurity states associated to inversion layers [INPE-3406-PRE/675] N85-27702
Optimum convection conditions for Czochralski growth of semiconductors [INPE-3395-PRE/665] N85-27703
Impurity bands associated with MOS inversion layers [INPE-3483-PRE/726] N85-27704
On the choice of coordinates for semiconductor simulation [AD-A152214] N85-27708

SENSITIVITY
Acceleration-resistant crystal resonator [AD-D011627] N85-27144
Acceleration sensitivity reduction method [AD-D011631] N85-27146
Earth station antenna sidelobe characteristics [PB85-164986] N85-27159
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology [AD-A151956] N85-27548

SEPARATED FLOW
The role of computational fluid dynamics in aeronautical engineering N85-26829
Numerical analysis of flow non-uniformity in the hot gas manifold of the Space Shuttle main engine N85-26899
Structural stability and bifurcation in conical flow fields [VTH-LR-424] N85-27282

SEQUENCING
The evolutive state: A new definition of system state to include sequencing of events N85-26843

SEQUENTIAL ANALYSIS
A software simulation study of a sequential decoder using the Fano algorithm N85-27100

SERUMS
Experiments in microwave exposure in the rat: Body temperature, serum chemistry and the use of chemical restraint [PB85-156834] N85-27512

SERVICE LIFE
Thrust chamber life prediction N85-26865
Fatigue criterion to system design, life and reliability [NASA-TM-87017] N85-27226

SERVOCONTROL
Control of motion of manipulator robots on basis of first-order kinematic algorithms N85-27047

SERVOMECHANISMS
Control of motion of manipulator robots on basis of first-order kinematic algorithms N85-27047

SET THEORY
Solving the minimal least squares problem subject to bounds on the variables [TRITA-NA-8215] N85-27580
Schubert varieties are arithmetically Cohen-Macaulay N85-27592

SHAFTS (MACHINE ELEMENTS)
Electric motors with elastically mounted rotors N85-27048
Monitoring of turbo-machines by shaft vibration measurement [BLL-TRANS-7900-(9022.09)] N85-27255
Quasi-steady vibrations of a rotating shaft grazing an obstacle: Spiral vibration [BLL-CE-TRANS-7962-(9022.09)] N85-27256

SHALLOW WATER
The theoretical response of a vertical line array to wind-generated noise in shallow water [AD-A151730] N85-27638

SHAPED CHARGES
Generation of detonation waves of given spatial and temporal characteristics [ISL-R-103/83] N85-27021

SHAPES
An IKBS approach to image understanding [AD-A151992] N85-27599

SHEAR FLOW
Studies of structure and modeling in turbulent shear flows [AD-A151807] N85-27170

SHEAR LAYERS
An experimental study of compressible turbulent reattaching free shear layers N85-27161
SHEAR PROPERTIES
Studies of structure and modeling in turbulent shear flows
[AD-A151807] N85-27170
SHEAR STRESS
Study of stresses on surface of flat barrier immersed in under expanded jet of rarefied gas N85-27061
SHELL THEORY
The nonlinear analysis of thick composite plates using a cubic spline function
[AD-A152115] N85-27268
An analysis for axially compressed orthotropic shells with a multimode imperfection representation
[VTH-LR-422] N85-27281
SHELLS (STRUCTURAL FORMS)
Stressed-strained state of tubular shells under uniformly distributed pressure N85-27067
Research in the field of rib stiffened shell stability N85-27068
Dynamic response of shells and plates subjected to variable magnitude traveling loads N85-27250
The statistical analysis of initial imperfection measurements --- shell profiles
[VTH-LR-442] N85-27622
SHIPS
Special features of the one-sided automatic welding of structures of Al-Mg alloys N85-27222
An inexpensive radar-responding relocation device for drifting oceanographic instruments
[AD-A152170] N85-27505
The PINGUIN B3: A remotely piloted vehicle for mine identification and disposal
[MBB-UM-1/84-O] N85-27735
SHOCK (PHYSIOLOGY)
Hazards of VLF electromagnetic fields N85-27136
SHOCK TUBES
Simulation of interior ballistics flows in a shock tube
[ISL-CO-222/83] N85-27183
SHOCK WAVE GENERATORS
Generation of detonation waves of given spatial and temporal characteristics
[ISL-R-103/83] N85-27021
SHOCK WAVE INTERACTION
A curved test section for research on transonic shock wave-boundary layer interaction
[VTH-LR-414] N85-26682
Numerical solution of transonic normal shock wave-boundary layer interaction using the Bohning-Zierop model --- wind tunnel flow
[VTH-LR-416] N85-26683
Theoretical investigation of three-dimensional shock wave turbulent boundary layer interactions. Part 3
[AD-A152251] N85-27177
An experimental investigation of the interaction between a shock wave and a turbulent boundary layer on a convex wall
[VTH-LR-428] N85-27187
SHOCK WAVE PROPAGATION
Molecular spectroscopy from the Kuiper Airborne Observatory
[NASA-CR-175748] N85-27783
SHOCK WAVES
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction
[NASA-CR-175788] N85-26665
Evaluation of an algorithm for the solution of the time-dependent Euler equations
[AD-A151993] N85-27600
Analyses of orderly structures in jets and the relationship with emitted noise
[ISL-R-117/83] N85-27646
The soft X-ray background as a supernova blast wave viewed from inside: Solar abundance models
[NASA-CR-175767] N85-27813
SHORT CIRCUITS
Study of the degradation of short-circuit current and the open-circuit tension of spatial solar cells as a function of the fluency of 1MeV electrons
[INPE-3358-PRE/634] N85-27814
SHORT TAKEOFF AIRCRAFT
The use of pressure sensing tape on the aircraft wing as sensor for flight control systems N85-26660
The STOL and maneuver technology program integrated control system N85-26757
SHORT WAVE RADIATION
Year-to-year variability of components of Earth's radiation budget according to satellite measurement data N85-26821
Short Wavelength Chemical Laser (SWCL) Workshop
[AD-A151959] N85-27211
SHORT WAVE RADIO TRANSMISSION
Influence of tropical F region in ionosphere on propagation of short radio waves N85-26798
SHUTTLE IMAGING RADAR
Shuttle imaging radar-A (SIR-A) data analysis --- geology of the Ozark Plateau of southern Missouri, land use in western Illinois, and vegetation types at Koonamore Station, Australia
[NASA-CR-175785] N85-27324
SIDE-LOOKING RADAR
Synthetic aperture side-looking radar image adjustment N85-27304
SIGNAL ANALYSIS
Signal analysis techniques for incipient failure detection in turbomachinery N85-26884
Algorithms for determining the relative complexity of dynamic signals
[BLL-M-36111-(5828.4)] N85-27574
SIGNAL ANALYZERS
Development of a modified time delay spectrometry technique for underwater acoustic measurements in a multipath environment
[AD-A152111] N85-27639
A portable pulse analyzer for nuclear geophysics using a Sinclair-TK microcomputer
[INPE-3278-PRE/601] N85-27666
SIGNAL DETECTION
Bit error rate of coherent M-ary PSK N85-27098
Robust detection of fading narrow-band signals in non-Gaussian noise
[AD-A152262] N85-27124
Phase-lock fiber optic interferometer
[AD-D011603] N85-27191
SIGNAL DETECTORS
Research and development of subsurface acoustic wave devices for sensor applications
[AD-A152197] N85-27642
SIGNAL ENCODING
Synchronizing heavily encoded data in bad weather N85-27099
Symbol stream combining in a convolutionally coded system N85-27101
SIGNAL FADING
Robust detection of fading narrow-band signals in non-Gaussian noise
[AD-A152262] N85-27124
SIGNAL PROCESSING
The impact of VLSI on guidance and control system design N85-26654
Synchronizing heavily encoded data in bad weather N85-27099
Symbol stream combining in a convolutionally coded system N85-27101
High-speed digital baseband mixer N85-27103
Signal processing for the analysis of transient electromagnetic data
[DE85-007244] N85-27125
The origin of brain potentials associated with selective visual attention
[AD-A152291] N85-27511
Algorithms for determining the relative complexity of dynamic signals
[BLL-M-36111-(5828.4)] N85-27574
Topics in time delay estimation
[AD-A152231] N85-27607
SIGNAL REFLECTION
Digital RF delay line for ECM (electronic countermeasure) look-through
[AD-A152120] N85-27120
SILANES
Development of acceptance criteria for batches of silane primer for external tank thermal protection system bonding applications
[NASA-CR-175850] N85-26995
SILICATES
Mechanical properties of lunar materials under anhydrous, hard vacuum conditions: Applications of lunar glass structural components
[DE85-006682] N85-27271
SILICON
An advanced solid state pressure transducer for high reliability SSME application N85-26905
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967
Flat-plate solar array project process development area: Process research of non-CZ silicon material
[NASA-CR-175777] N85-27382
Heavy doping effects in high efficiency silicon solar cells
[NASA-CR-175779] N85-27383
Electronic density of states for the double donor system Si:P, As
[INPE-3447-PRE/700] N85-27700
SILICON ALLOYS
LPCVD tungsten deposition on Si-Ge alloy
[DE85-005586] N85-26970
SILICON CARBIDES
Particulate and whisker toughened alumina composites
[DE85-005239] N85-26930
SILICON DIOXIDE
Dendritic growth from amorphous matrix
[DE85-007630] N85-27712
SILICON FILMS
In plane stress analysis
[NASA-CR-175775] N85-27259
Photovoltaic cell reliability research: Investigation of accelerated stress factors and failure-degradation mechanisms in terrestrial solar cells
[NASA-CR-175815] N85-27388
SILICON OXIDES
Impurity bands associated with MOS inversion layers
[INPE-3483-PRE/726] N85-27704
SILICONE RUBBER
Oil resistant silicone elastomers
[AD-131523] N85-26987
SILOXANES
Formulation/cure technology for ultrahigh molecular weight silphenylene-siloxane polymers
[NASA-TP-2476] N85-26990
SILVER
MOD silver metallization for photovoltaics
[NASA-CR-175773] N85-27381
SILVER ALLOYS
Study of the kinetics and thermodynamics of hydrogen in Pd-based alloys
[DE85-007341] N85-26969
SILVER HALIDES
Infrared presensitization photography N85-27189
SIMILARITY NUMBERS
Study of the functions of similarity of the planetary boundary layer. Part 2: Results
[INPE-3130-PRE/521-VOL-2] N85-27429
SIMILARITY THEOREM
Study of the functions of similarity of the planetary boundary layer. Part 1: Theory
[INPE-3129-PRE/520-PT-1] N85-27428
SIMULATION
Flight testing and development of the F/A-18A digital flight control system N85-26743
Development of a persistent chemical agent simulation system
[NASA-CR-175780] N85-26937
Development of a Persistent Chemical Agent Simulator System (PCASS)
[NASA-CR-175776] N85-26938
Pyrotechnic shock simulation using the controlled response of a resonating bar fixture
[DE85-006537] N85-27181
In plane stress analysis
[NASA-CR-175775] N85-27259
The selection of the starting field: General versus tailored model N85-27294
Comparison of gravity field solution techniques N85-27295
Kinetic theory and simulation of multi-species plasmas in Tokamaks excited with ICRF microwaves
[DE85-006119] N85-27691
SINGLE CRYSTALS
Materials for advanced rocket engine turbopump turbine blades N85-26872
High-pressure hydrogen testing of single crystal superalloys for advanced rocket engine turbopump turbine blades N85-26875
Secondary ion mass spectrometry studies of solids and surfaces
[AD-A151744] N85-26939
Effects of wear on structure-sensitive magnetic properties of ceramic ferrite in contact with magnetic tape
[NASA-TM-87007] N85-26991
Acceleration-resistant crystal resonator
[AD-D011627] N85-27144
SINGULARITY (MATHEMATICS)
Structural stability and bifurcation in conical flow fields
[VTH-LR-424] N85-27282
SINTERING
Production of shaped parts of NITINOL alloys by solid-state sintering
[AD-A152089] N85-26966
Test and modeling for sintering theory
[DE85-007761] N85-27004
Impact of optical inhomogeneity in sintered interface between glasses on laser emission characteristics N85-27053
SITE SELECTION
Selection of promising sites for magma energy experiments
[DE85-006832] N85-27393

SIZE (DIMENSIONS)
A Gimbal sizing analysis for an IPACS rotating assembly
[NASA-CR-172524] N85-26913
SIZE DISTRIBUTION
Evolution of stratospheric aerosol size distribution from ground-based radiometric measurements: A study of El Chichon aerosol
[DE85-007555] N85-27439
Elemental analysis of aerosols in Transvaal urban and power-producing areas using time and size-resolved samples N85-27443
SKIN (ANATOMY)
Evaluation of a field expedient technique for sweat sample collection
[AD-A151916] N85-27521
SLENDER BODIES
An experimental and analytical study of the aerodynamic interference effects between two Sears-Haack bodies at Mach 2.7
[NASA-TM-85729] N85-26673
SLENDER CONES
Experimental investigations of prismatic cylinders in flow with harmonic pulsations
[KU-SFB-210/E/4] N85-27186
SLENDER WINGS
Numerical simulation of transonic flutter of a high-aspect ratio transport wing N85-26830
SMOG
Evaluation of chemical reaction mechanisms for photochemical smog. Part 2: Quantitative evaluation of the mechanisms, revised
[PB85-166080] N85-27408
Effect of traffic and meteorology on air pollution N85-27452
SMOOTHING
Uniformly high-order accurate non-oscillatory schemes, 1
[NASA-CR-175768] N85-27589
The essence of invexity
[CSIR-TWISK-321] N85-27626
SNOW
A survey of major east coast snowstorms, 1960-1983. Part 2. Summary of surface and upperlevel characteristics
[NASA-TM-86195] N85-27471
A survey of major east coast snowstorms, 1960-1983. Part 2: Case studies of eighteen storms
[NASA-TM-86196] N85-27472
SNOW COVER
Atmospheric frontal zone studies
[NASA-CR-175293] N85-27469
SNOWSTORMS
A survey of major east coast snowstorms, 1960-1983. Part 2. Summary of surface and upperlevel characteristics
[NASA-TM-86195] N85-27471
A survey of major east coast snowstorms, 1960-1983. Part 2: Case studies of eighteen storms
[NASA-TM-86196] N85-27472
SODIUM
Sodium and lithium corrosion in molybedenum heat pipes
[DE85-005561] N85-27179
A modeling analysis program for the JPL table mountain Io sodium cloud
[NASA-CR-175851] N85-27468
SODIUM SULFUR BATTERIES
Sixth DOE Electrochemical Contractor's Review. Extended abstracts
[DE84-013679] N85-27151
SOFTENING
Solution softening in molybdenum-rhenium alloys
[DE85-006706] N85-26972
SOFTWARE ENGINEERING
Active control technology: Past, present, future N85-26731
East Europe report: Science and technology
[JPRS-ESA-84-032] N85-26833
A robotic system for preparing reagent and dilution vials
[DE85-008262] N85-27231
Fujian forges ahead in electronic production N85-27301
Symbiosis between postgraduate training and research projects: A successful experience
[INPE-3216-PRE/569] N85-27330
A framework for software development
[AD-A152067] N85-27551
Diagnosis: Using automatic test equipment and an artificial intelligence expert system
[AD-A151918] N85-27576
Software for reflectivity calculations of X-ray mirrors, revision 1
[DE85-006642] N85-27686
SOFTWARE TOOLS
Development of computer aided database design and maintenance tools
[AD-A151782] N85-27537
Further development of an Interactive Control Engineering Computer Analysis Package (ICECAP) for discrete and continuous systems
[AD-A151783] N85-27546
SOIL MAPPING
Identification of structure of soil-vegetation cover using aerial and space photographs N85-26826
SOIL SCIENCE
Microbial ecology of extreme environments: Antarctic yeasts and growth in substrate-limited habitats
[NASA-CR-175810] N85-27509
SOILS
Multiple regression analysis of photographic image of soil properties N85-26825
Use of Goudrian model in studying laws of reflection in vegetation-soil system in optical range. 2: Influence of illumination conditions on spectral brightness coefficients N85-26827
Interactive effects of acid rain and gaseous air pollutants on natural terrestrial vegetation
[DE85-005255] N85-27401
Ultrasonic dispersion of soils for routine particle size analysis: Recommended procedures
[DE85-005530] N85-27643
SOLAR ACTIVITY
Periodicity of variations in galactic cosmic ray fluxes and solar activity parameters near 20th cycle minimum N85-26791
Dependence of equatorial F-region plasma bubble rise velocity and dynamo electric field on solar cycle
[INPE-3439-PRE/696] N85-27434
Very large array observations of coronal loops and related observations of solar type stars
[AD-A152027] N85-27817
Solar activity monitoring satellite (SAMSAT): Impact on space environment services
[PB85-165066] N85-27818
Solar-Geophysical Data Number 484, December 1984. Part 1 (prompt reports): Data for November 1984, October 1984 and late data
[NASA-CR-175829] N85-27819
SOLAR ACTIVITY EFFECTS
Bursts of relativistic electrons in magnetopause and in outer radiation belt N85-26801
SOLAR ARRAYS
Proposed energy systems for the Brazilian data collection satellite
[INPE-3393-PRE/664] N85-26856
MOD silver metallization for photovoltaics
[NASA-CR-175773] N85-27381
Design and development of a linear Fresnel lens air-cooled photovoltaic module and a stand-alone photovoltaic collector array
[DE85-006854] N85-27391
SOLAR CELLS
Proposed energy systems for the Brazilian data collection satellite
[INPE-3393-PRE/664] N85-26856
Analysis of orbit transfer vehicles for GPS Block 3 satellites
[AD-A152021] N85-26860
Solar elements with distributed parameters N85-27036
Heavy doping effects in high efficiency silicon solar cells
[NASA-CR-175779] N85-27383
Documentation and solar cell modules
[NASA-CR-175769] N85-27384
Photovoltaic cell reliability research: Investigation of accelerated stress factors and failure-degradation mechanisms in terrestrial solar cells
[NASA-CR-175815] N85-27388
Maintenance of photovoltaic power systems
[AD-A152299] N85-27390
Polycrystalline semiconductor heterojunction modelling (CdS/CuInSe(sub)2)
[DE85-002913] N85-27713
Study of the degradation of short-circuit current and the open-circuit tension of spatial solar cells as a function of the fluency of 1MeV electrons
[INPE-3356-PRE/634] N85-27814
SOLAR COLLECTORS
An evaluation of thermal storage for liquid-metal, solar thermal receivers
[DE85-002929] N85-27394
SOLAR COOLING
Operation of a low temperature absorption chiller at rating point and at reduced evaporator temperature
[DE85-006308] N85-27030
SOLAR CORONA
Analysis of short-period changes in intensity of hard X-radiation of solar flares registered aboard Venera-13 and Venera-14 spacecraft N85-26806
Remote sensing of the plasma with time delay measurements (coronal sounding) N85-27804
The Faraday rotation experiment — solar corona N85-27805
Very large array observations of coronal loops and related observations of solar type stars
[AD-A152027] N85-27817
SOLAR COSMIC RAYS
Correlated fluctuations of charged particle fluxes and magnetic field according to data from Intercosmos-10 satellite N85-26802
SOLAR ENERGY
A bibliography of reports of the Sandia solar thermal distributed receiver systems project
[SAND-84-0313] N85-27378
A multifunction wall system for application with solar heating and ground cooling
[DE85-006792] N85-27395
SOLAR ENERGY CONVERSION
Space power plants N85-26813
Solar elements with distributed parameters N85-27036
A bibliography of reports of the Sandia solar thermal distributed receiver systems project
[SAND-84-0313] N85-27378
SOLAR FLARES
Satellite research on solar flares N85-26776
Analysis of short-period changes in intensity of hard X-radiation of solar flares registered aboard Venera-13 and Venera-14 spacecraft N85-26806
Solar-Geophysical Data Number 484, December 1984. Part 2 (comprehensive reports): Data for June 1984, January 1982 and Miscellanea
[NASA-CR-175826] N85-27820
SOLAR GRAVITATION
Heliocentric sail problem with variable gravity field reduction N85-26816
SOLAR HEATING
A multifunction wall system for application with solar heating and ground cooling
[DE85-006792] N85-27395
SOLAR HOUSES
A multifunction wall system for application with solar heating and ground cooling
[DE85-006792] N85-27395
SOLAR MAGNETIC FIELD
The Faraday rotation experiment — solar corona N85-27805
SOLAR OBSERVATORIES
Very large array observations of coronal loops and related observations of solar type stars
[AD-A152027] N85-27817
SOLAR ORBITS
Heliocentric sail problem with variable gravity field reduction N85-26816
SOLAR OSCILLATIONS
The problem of atmospheric turbulence
[NASA-CR-175783] N85-27464
SOLAR PHYSICS
Solar-Geophysical Data Number 484, December 1984. Part 2 (comprehensive reports): Data for June 1984, January 1982 and Miscellanea
[NASA-CR-175826] N85-27820
SOLAR POSITION
Simultaneous Earth observations from 2 satellites
[NASA-TM-86204] N85-27325
SOLAR RADIATION
Numerical integration through force discontinuities: Solar radiation pressure N85-27298
Intercomparison of Radiation Codes in Climate Models (ICRCCM)
[DE85-007251] N85-27487
Results from the Helios galactic and solar cosmic ray experiment (E7) N85-27807
SOLAR RADIO BURSTS
The Helios radio astronomy experiment N85-27803
Microwaves and hard X-rays ultrafast time structures at the impulsive phase of solar bursts
[INPE-3478-PRE/721] N85-27816
SOLAR RADIO EMISSION
A synchrotron/inverse Compton interpretation of a solar burst producing fast pulses at lambda 3 mm and hard X-rays N85-27815
SOLAR REFLECTORS
MOD silver metallization for photovoltaics
[NASA-CR-175773] N85-27381
SOLAR SAILS
Heliocentric sail problem with variable gravity field reduction N85-26816
SOLAR SYSTEM
European space science horizon 2000
[ESA-SP-1070] N85-26771

The micrometeorite experiment on Helios — inner solar system N85-27797
The fast individualists in the solar system: Cosmic rays N85-27806

SOLAR TERRESTRIAL INTERACTIONS
Geophysical responses of dynamics of solar wind transition region N85-26795

SOLAR THERMAL ELECTRIC POWER PLANTS
An evaluation of thermal storage for liquid-metal, solar thermal receivers
[DE85-002929] N85-27394

SOLAR WIND
Instability of solar wind near streamlined bodies N85-26794
Geophysical responses of dynamics of solar wind transition region N85-26795
Electric field and energy transfer by magnetopause reconnection
[INPE-3448-PRE/701] N85-27432
An interplanetary magnetic field ensemble at 1 AU
[NASA-TM-86209] N85-27784
Direct evidence for solar wind control of Jupiter's hectometer-wavelength radio emission
[NASA-TM-86073] N85-27790
Ten years solar wind experiments on Helios 1 and Helios 2 N85-27798
Plasma waves in the solar wind: Ten years of Helios observations N85-27801

SOLAR X-RAYS
Microwaves and hard X-rays ultrafast time structures at the impulsive phase of solar bursts
[INPE-3478-PRE/721] N85-27816

SOLAR-PUMPED LASERS
Theoretical studies of solar-pumped lasers
[NASA-CR-175801] N85-27206

SOLID LUBRICANTS
Effect of counterface material type and its topography on the tribological properties of polyimide composites
[NASA-TM-87036] N85-26993
Tooth wear in worm gears in vacuum N85-27070

SOLID PROPELLANT COMBUSTION
Solid fuel combustion chamber
[VTH-LR-415] N85-26918
Solid fuel combustion chamber
[VTH-LR-438] N85-26919
Solid fuel combustion chamber research in the Netherlands
[VTH-LR-444] N85-26920
The development of a computational model for a two-dimensional turbulent flow. Part 1: Mathematical background — solid fuel combustion
[VTH-LR-436-PT-1] N85-27188

SOLID PROPELLANT ROCKET ENGINES
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942

SOLID ROCKET PROPELLANTS
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
Analysis of deflagration to detonation transition in high-energy solid propellants N85-27010

SOLID SOLUTIONS
Dissolution of solid solutions in absence of internal mass transfer
[BLL-M-36092-(5828.4)] N85-26959

SOLID STATE DEVICES
An advanced solid state pressure transducer for high reliability SSME application N85-26905

SOLID SURFACES
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction
[NASA-CR-175788] N85-26685

SOLIDIFICATION
Microstructures and properties of rapidly solidified alloys
[NASA-CR-172377] N85-26961
Rapid solidification of candidate ferritic steels
[DE85-006596] N85-26971

SOLIDS
Secondary ion mass spectrometry studies of solids and surfaces
[AD-A151744] N85-26939
Bound and free moisture studies of solid materials by FTNMR
[DE85-003227] N85-26952
Numerical resolution calculation for elastic-plastic impact problems
[AD-A152292] N85-27270
Transverse periodic boundary conditions in molecular dynamics with uniaxial strain shock waves
[DE85-006497] N85-27656

SOLITARY WAVES
Wave propagation in density stratified fluids N85-27162

SONAR
An overview of stochastic signal modeling
[AD-A152144] N85-27605

SORBENTS
Low pressure storage of methane on interlayered clays for potential vehicular applications
[DE85-006949] N85-27017

SOUND FIELDS
An overview of stochastic signal modeling
[AD-A152144] N85-27605
The theoretical response of a vertical line array to wind-generated noise in shallow water
[AD-A151730] N85-27638

SOUND INTENSITY
Acoustic propagation in a thermally stratified atmosphere
[NASA-CR-175787] N85-27636

SOUND TRANSMISSION
The theoretical response of a vertical line array to wind-generated noise in shallow water
[AD-A151730] N85-27638
Development of a modified time delay spectrometry technique for underwater acoustic measurements in a multipath environment
[AD-A152111] N85-27639

SOUND WAVES
An experimental investigation of two-dimensional flame-vortex interactions N85-26934
Acoustic propagation in a thermally stratified atmosphere
[NASA-CR-175787] N85-27636
The theoretical response of a vertical line array to wind-generated noise in shallow water
[AD-A151730] N85-27638
Research and development of subsurface acoustic wave devices for sensor applications
[AD-A152197] N85-27642

SOUTHERN CALIFORNIA
Preliminary assessment of climatic change during late Wisconsin time, southwest Great Basin and vicinity, Arizona, California and Nevada
[DE85-006343] N85-27488

SOUTHERN HEMISPHERE
Motivation for satellite tracking of southern elephant seals Mirounga leonina at sea N85-27346
X-ray intensification at balloon altitudes of the South Atlantic magnetic anomaly in association with geomagnetic activity
[INPE-3469-PRE/712] N85-27437

SOVIET SPACECRAFT
Substorms in energetic radiation belt particles according to data from Meteor artificial Earth satellite N85-26788

SOYBEANS
Modeling the backscattering and transmission properties of vegetation canopies
[E85-10099] N85-27320

SPACE CHARGE
Optically triggered transferred-electron device microwave burst and single pulse generators
[AD-D011614] N85-27141

SPACE COMMUNICATION
Meteorological factors in Earth-Satellite propagation
[NASA-CR-175764] N85-27089
The Telecommunications and Data Acquisition Report
[NASA-CR-175842] N85-27094
Synchronizing heavily encoded data in bad weather N85-27099

SPACE COOLING (BUILDINGS)
Experimental testing of cooling by low pressure adsorption in a zeolite
[DE85-007509] N85-26763

SPACE EXPLORATION
USSR report: Space
[JPRS-USP-85-004] N85-26772
Forecasts on long-range development of space programs N85-26830
US said to seek military advantage in space N85-26831
East Europe report: Science and technology
[JPRS-ESA-85-019] N85-27077
International cooperation in space exploration N85-27079
East-West cooperation in outer space
[S-HRG-98-1064] N85-27767

SPACE FLIGHT TRAINING
Cosmonaut Savitskaya says many women in cosmonaut training N85-26774

SPACE GLOSSARIES
Tenth Conference of Working Group of Socialist Countries on Remote Sensing of Earth under Intercosmos Program N85-26820

SPACE MANUFACTURING
An analysis of alternate hydrogen sources for lunar manufacture
[DE85-007234] N85-27792

SPACE MISSIONS
European space science horizon 2000
[ESA-SP-1070] N85-26771
A SLAM II simulation model for analyzing space station mission processing requirements
[NASA-CR-175664] N85-26853

SPACE NAVIGATION
Method for evaluating perturbation in algorithms for solving navigational problems N85-26783
Statistical regularization methods in problem of navigational determination of space vehicle orbits N85-26784

SPACE PLASMAS
Measuring electrical field fluctuations by Langmuir Double Probe Method N85-26789
Geophysical responses of dynamics of solar wind transition region N85-26795
Determining effective rate of plasma heating in outer equatorial ionosphere using data from ISIS-1 and ISIS-2 satellites N85-26797

SPACE PLATFORMS
Artificial intelligence in space platforms
[AD-A152078] N85-27578

SPACE POWER REACTORS
Analysis of alkali liquid metal Rankine space power systems
[DE85-005089] N85-26917

SPACE POWER UNIT REACTORS
Overview of the 1985 NASA Lewis Research Center SP-100 free-piston Stirling engine activities
[NASA-TM-87028] N85-27769

SPACE PROCESSING
Microgravity: A new tool for basic and applied research in space
[EP-212] N85-26767

SPACE PROCESSING APPLICATIONS ROCKET
Technological experiments on high-altitude rockets N85-26818

SPACE PROGRAMS
East Europe report: Science and technology
[JPRS-ESA-84-032] N85-26833
Contribution to space program reviewed N85-26834
Department of Housing and Urban Development-independent agencies appropriations for 1986. Part 6: National Aeronautics and Space Administration
[GPO-47-235] N85-27768

SPACE RATIONS
Research on zero-gravity botany apparatus N85-26811

SPACE SHUTTLE MAIN ENGINE
Advanced High Pressure O2/H2 Technology
[NASA-CP-2372] N85-26862
Thrust chamber life prediction N85-26865
Manufacturing and producibility technology N85-26866
Ceramics for advanced O2/H2 application N85-26868
Vacuum plasma coatings for turbine blades N85-26869
Material technology N85-26870
Design overview of fiber-reinforced superalloy composites for the Space Shuttle main engine N85-26871
Development of hydrogen resistant alloys N85-26873
Development of new materials for turbopump bearings N85-26877
Bearings working group N85-26878
Advanced rocket engine cryogenic turbopump bearing thermal model N85-26879
Hybrid bearings for LH2 and LO2 turbopumps N85-26880
Powder metallurgy bearings for advanced rocket engines N85-26881
Rolling contact fatigue life of chromium ion plated 440C bearing steel N85-26882
Technical overview structural dynamics N85-26883
Signal analysis techniques for incipient failure detection in turbomachinery N85-26884
Flow dynamic environment data base development for the SSME N85-26885
Turbine blade friction damping study N85-26886
Preliminary results on passive eddy current damper technology for SSME turbomachinery N85-26890
Rotor response for transient unbalance changes in a nonlinear simulation N85-26892
Damping seal verification setup N85-26893
Damping seals for turbomachinery N85-26894
Vibration characteristics of the HPOTP (High Pressure Oxygen Turbopump) of the SSME (Space Shuttle Main Engine) N85-26895
Fluid and gas dynamics N85-26897
Experimental evaluation of an advanced Space Shuttle main engine hot-gas manifold design concept N85-26898

Redistribution of the inlet temperature profile through the SSME fuel turbine N85-26901
Analytical study of flow phenomena in SSME turnaround duct geometries N85-26902
Instrumentation technology overview N85-26903
Fiber optic Raman thermometer for Space Shuttle main engine preburner profiling N85-26904
An advanced solid state pressure transducer for high reliability SSME application N85-26905
Nonintrusive shaft speed sensor N85-26908
Flow-induced vibration of the SSME LOX posts: Additional issues [DE85-007339] N85-26916

SPACE SHUTTLE PAYLOADS
Microgravity: A new tool for basic and applied research in space [EP-212] N85-26767
Orbiter middeck/payload standard interfaces control document [NASA-TM-87473] N85-26840

SPACE SHUTTLES
Formulation and implementation of nonstationary adaptive estimation algorithm with applications to air-data reconstruction [NASA-TM-86727] N85-26899
Active control technology experience with the Space Shuttle in the landing regime N85-26747
Space Shuttle program communication and tracking systems interface analysis [NASA-CR-171862] N85-26841
Cost prediction model for various payloads and instruments for the Space Shuttle Orbiter [NASA-CR-175781] N85-26842
Consultative Committee for Space Data Systems. Panel 1: Support [NASA-CR-175786] N85-27090
The Bresex multispectral camera: Preliminary characteristics [INPE-3424-PRE/687] N85-27195

SPACE STATIONS
The NASA Space Station program plans [NASA-TM-87474] N85-26846
Spacestation: The next logical step [NASA-EP-213] N85-26847
Space Station Engineering and Technology Development [NASA-CR-175806] N85-26851
Space Station Spartan study [NASA-TM-86215] N85-26852
A SLAM II simulation model for analyzing space station mission processing requirements [NASA-CR-175864] N85-26853
Tethered nuclear power for the Space Station [NASA-TM-87023] N85-26912

SPACE WEAPONS
US said to seek military advantage in space N85-26831
Military journal on US intelligence satellites N85-26832

SPACE-TIME FUNCTIONS
Comment on quantum effects on 4-dimensional space-time symmetries [DE85-007760] N85-27722

SPACEBORNE ASTRONOMY
European space science horizon 2000 [ESA-SP-1070] N85-26771

SPACEBORNE EXPERIMENTS
Academician Zuyev notes plans for lasers on spacecraft for atmospheric research N85-26775
Satellite research on solar flares N85-26776

SPACEBORNE PHOTOGRAPHY
Glow of ionospheric F-layer in Line 630 nm determined from photographs taken aboard Salyut-6 orbital station: Interpretation of results N85-26799
SVIT complex for analysis of space photography N85-26819
Tenth Conference of Working Group of Socialist Countries on Remote Sensing of Earth under Intercosmos Program N85-26820
Study and mapping of anthropogenic effect on environment in different regions of USSR on basis of space photographs N85-26824
Multiple regression analysis of photographic image of soil properties N85-26825
Analysis of mesofissuring on space photographs: New technique for study of petroleum and gas deposits N85-26828

SPACEBORNE TELESCOPES
Dall-Null tester for spaceborne applications [AD-A151772] N85-27779

SPACECRAFT COMMUNICATION
Space Shuttle program communication and tracking systems interface analysis [NASA-CR-171862] N85-26841
Consultative Committee for Space Data Systems. Panel 1: Support [NASA-CR-175786] N85-27090
SESC (Space Environment Services Center) satellite broadcasting 10-year plan [PB85-163541] N85-27126

SPACECRAFT CONTROL
Identification and control of structures in space [NASA-CR-175790] N85-26850
Artificial intelligence in space platforms [AD-A152078] N85-27578

SPACECRAFT DESIGN
Progress of computational fluid dynamics in the world N85-26612
A study of spacecraft technology and design concepts, volume 1 [NASA-CR-172579-VOL-1] N85-26844
A study of spacecraft technology and design concepts. Volume 2: Appendices [NASA-CR-172579-VOL-2] N85-26845
The NASA Space Station program plans [NASA-TM-87474] N85-26846
Spacestation: The next logical step [NASA-EP-213] N85-26847
Space Station Spartan study [NASA-TM-86215] N85-26852

SPACECRAFT MOTION
Positions of relative equilibrium of satellite-gyrostat N85-26777
Optimum parameters of aerogyroscopic satellite orientation system N85-26782

SPACECRAFT POWER SUPPLIES
Proposed energy systems for the Brazilian data collection satellite [INPE-3393-PRE/664] N85-26856
Tethered nuclear power for the Space Station [NASA-TM-87023] N85-26912

SPACECRAFT PROPULSION
Advanced energy storage systems [AD-A152244] N85-26915

SPACECRAFT STABILITY
Stability of periodic satellite motions relative to center of mass in circular orbit N85-26780

SPACECRAFT STRUCTURES
Analysis of elastoplastic grids under conditions of variable loads [REPT-16/1984] N85-27242

SPACECRAFT SURVIVABILITY
A study of spacecraft technology and design concepts. Volume 2: Appendices [NASA-CR-172579-VOL-2] N85-26845

SPACECRAFT TRACKING
Space Shuttle program communication and tracking systems interface analysis [NASA-CR-171862] N85-26841

SPACING
A heuristic solution to the spacing problem: Maximizing the minimum Euclidean distance among N points in a convex region [AD-A152116] N85-27603

SPARTAN SATELLITES
Space Station Spartan study [NASA-TM-86215] N85-26852

SPATIAL DISTRIBUTION
Multiple scattering of electromagnetic waves in discrete random media [AD-A151766] N85-27112
Study of spatial distribution of auroras N85-27315
Spatial and temporal visual masking and visibility [AD-A151968] N85-27524

SPECIFIC HEAT
Characterization-curing-property studies of HBRF 55A resin formulations [NASA-CR-175836] N85-26989

SPECIFICATIONS
A description of the process of elaborating man-machine dialog in an aircraft equipped with cathode tubes: Roles and specifications of piloted simulation methods N85-26658
Water brake convertor: A simple device to convert mechanical energy into heat energy [DE85-006021] N85-26786
Orbiter middeck/payload standard interfaces control document [NASA-TM-87473] N85-26840
Standards and specifications for geodetic control networks [PB85-166478] N85-27374

SPECTRA
Wave directional spectra via ARGOS N85-27343

SPECTRAL EMISSION
Spectroscopic studies of a railgun muzzle flash [MRL-R-952] N85-26837

SPECTROMETERS
Mirror accessory for line straightening in diffraction spectrometers N85-27054
New focal plane detector system for the broad range spectrometer [DE85-005370] N85-27201
Cryostat and electronic development associated with multi-detector spectrometer systems [DE85-007624] N85-27203
Acousto-optical spectrometers at Itapetinga Radio Observatory [INPE-3479-PRE/722] N85-27776

SPECTROPHOTOMETRY
Fourier transform infrared spectrophotometric analysis of resin mix stoichiometry, revision 1 [DE85-007272] N85-26951

SPECTROSCOPIC TELESCOPES
Dall-Null tester for spaceborne applications [AD-A151772] N85-27779

SPECTROSCOPY
Spectroscopic investigation of materials for frequency agile laser systems [AD-A151731] N85-27208
Nuclear spectroscopic studies [DE85-006894] N85-27652
Positron annihilation studies of vacancy formation in tungsten, chromium, and niobium [DE85-006837] N85-27710

SPECTRUM ANALYSIS
Spectral characteristics of protons at low and high altitudes during geomagnetic storm of 29 July 1977 N85-26786
Multiple regression analysis of photographic image of soil properties N85-26825
Spectroscopic studies of a railgun muzzle flash [MRL-R-952] N85-26837
A phase modulation evaluation procedure for an ARGOS type signal N85-27336
Development of a modified time delay spectrometry technique for underwater acoustic measurements in a multipath environment [AD-A152111] N85-27639

SPEECH RECOGNITION
Automation of the process of speech signal segmentation in an analogic-numeric system [REPT-5/1984] N85-27082
Implementation of a real-time, interactive, continuous speech recognition system [AD-A151936] N85-27117
Evaluating syntactic constraints to speech recognition in a fighter aircraft environment [AD-A152117] N85-27119

SPEED CONTROL
Pulsewidth modulated speed control of brushless dc motors [AD-A151966] N85-27148

SPHERICAL CAPS
Estimation of the depth of a spherical cap in an hydraulic drawing test for some simple conditions of loss of stability [REPT-4/1984] N85-26958

SPHEROMAKS
Magnetohydrodynamic stability of spheromak plasma in toroidal flux conserver with rectangular cross section [IPPJ-718] N85-27678

SPIRAL ANTENNAS
Radiation and scattering of spiral antennas [AD-A151929] N85-27116

SPLINE FUNCTIONS
The nonlinear analysis of thick composite plates using a cubic spline function N85-27252
Noise correction on LANDSAT images using a spline-like algorithm [E85-10098] N85-27319
An interpolation method with the possibility of first derivative correction [INPE-3352-PRE/631] N85-27590
Surface interpolation using weighted splines [INPE-3367-PRE/658] N85-27591

SPOT (FRENCH SATELLITE)
DORIS: Prediction in Doppler measurement — satellite onboard measurement [CNES-CT/DTI/MS/AE/170] N85-26843

SPRAYED COATINGS
Rocket thrust chamber thermal barrier coatings N85-26867
Vacuum plasma coatings for turbine blades N85-26869

SPREAD F
Equatorial F-region irregularity latitudinal extension and dynamo electric field [INPE-3494-PRE/731] N85-27433

SPUTTERING
Measurement of NSLS distributed diode sputter ion pump characteristics [DE85-006550] N85-27031

STABILITY
Estimation of the depth of a spherical cap in an hydraulic drawing test for some simple conditions of loss of stability
[REPT-4/1984] N85-26956
Models of long-period superstructure
[DE85-007659] N85-26981
STABILITY AUGMENTATION
A perspective on superaugmented flight control advantages and problems N85-26733
Demonstration of relaxed stability on a commercial transport N85-26745
STABILITY TESTS
Environmental stability of intercalated graphite fibers
[NASA-TM-87025] N85-26992
STABILIZED PLATFORMS
Estimates of errors of a gyroscope stabilized platform N85-27050
STAGNATION POINT
Conical stagnation points in the flow around an external corner — delta wings
[VTH-LR-396] N85-26680
STAINLESS STEELS
Ignition of metals in high pressure oxygen N85-26874
Creep-fatigue interaction of notched 304 stainless steel bars N85-27249
STAMPING
Calculating reliability and productivity of cold stamping robot complex as queuing system N85-27039
Experience of sheet stamping robotic complexes N85-27041
STANDARD DEVIATION
Positioning accuracy of the ARGOS system in operational use N85-27335
STANDARDIZATION
An analysis of data dictionaries and their role in information resource management
[AD-A152134] N85-27121
NBS physical measurement services
[NBSIR-84-2875] N85-27633
DoD manual for standard data elements, part 1
[AD-A152201] N85-27754
STANDARDS
Management of vacuum leak-detection processes, standards and calibration
[DE85-006705] N85-27202
Standards and specifications for geodetic control networks
[PB85-166478] N85-27374
Review of national emission standards for mercury
[PB85-153906] N85-27406
Mapping principles for the standards interface for computer aided design
[PB85-177905] N85-27566
NBS physical measurement services
[NBSIR-84-2875] N85-27633
DoD manual for standard data elements, part 2
[AD-A152202] N85-27755
DoD manual for standard data elements, part 3
[AD-A152203] N85-27756
NBS (National Bureau of Standards) research reports
[PB85-127421] N85-27764
STAPHYLOCOCCUS
Structural-functional changes in bacterial cells under spaceflight conditions N85-26812
STARS
Very large array observations of coronal loops and related observations of solar type stars
[AD-A152027] N85-27817
STATIC AERODYNAMIC CHARACTERISTICS
Static longitudinal stability and control characteristics of the Fokker F27 Friendship calculated by simple handbook methods
[VTH-LR-394] N85-26728
STATIC DEFORMATION
Consolidation theory with consideration of frame plasticity
[REPT-9/1984] N85-27240
STATIC LOADS
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction
[NASA-CR-175788] N85-26665
STATIC STABILITY
Realisation of relaxed static stability on a commercial transport N85-26746
STATIONARY ORBITS
Construction and functioning of extended orbital systems N85-26814
STATIONKEEPING
Artificial intelligence in space platforms
[AD-A152078] N85-27578
STATISTICAL ANALYSIS
An evaluation of the performance of a new storm tracking methodology
[AD-A152234] N85-27484
Circulation statistics from January and July: Simulation with the NCAR (National Center for Atmospheric Research) community climate model (CCMOB)
[PB85-165637] N85-27497
Statistical study of the dynamic analysis of the workload in the A310 certification campaign N85-27531
Locally-weighted-regression scatter-plot smoothing (LOWESS): A graphical exploratory data analysis technique
[AD-A152239] N85-27609
Multivariable statistical modelling and its application N85-27617
Mutli-particle quantum mechanics obeying fractional statistics
[DE85-007830] N85-27723
Data management issues of statistical databases
[DE85-007616] N85-27763
STATISTICAL DISTRIBUTIONS
Multinomial form of the solution of problems of the statistics of elastic rectangular disks
[REPT-17/1984] N85-27244
STATISTICAL WEATHER FORECASTING
A weather service for agriculture N85-27450
STATOR BLADES
Development of a rotor wake-vortex model, volume 1
[NASA-CR-174849] N85-26668
STEADY FLOW
Boundary layer at moving cylinder surface N85-27064
STEADY STATE
Rotor blade flap-lag stability and response in forward flight in turbulent flows N85-26698
Numerical analysis of flow non-uniformity in the hot gas manifold of the Space Shuttle main engine N85-26899
STEELS
Rolling contact fatigue life of chromium ion plated 440C bearing steel N85-26882
Determination of permissible heating rate of metal
[BLL-M-36107-(5828.4)] N85-26957
Study of oscillations of composite cylindrical shells using a dynamic stiffness technique N85-27066
Full statistical characteristics of microdeformation
[BLL-M-36076-(5828.4)] N85-27254
An X-ray study of residual stresses in narrow groove TIG weldments
[DE85-006485] N85-27274
STELLAR MASS ACCRETION
Thermal and magnetic properties of neutron stars N85-27774
STELLARATORS
TOKASTAR: A Tokamak stellarator hybrid with possible bean-shaped operation
[IPPJ-718] N85-27680
STIFFNESS
Study of oscillations of composite cylindrical shells using a dynamic stiffness technique N85-27066
STIFFNESS MATRIX
Finite axisymmetric deformation of a thin shell of revolution N85-27251
STIRLING CYCLE
Overview of the 1985 NASA Lewis Research Center SP-100 free-piston Stirling engine activities
[NASA-TM-87028] N85-27769
STOCHASTIC PROCESSES
Graphic simulation of a machine-repairman model
[AD-A151761] N85-26633
Characteristic functionals of stochastic wave processes
[REPT-14/1984] N85-27084
Some new results on the discrete-time Riccati Equation and their use in the design of optimal regulators and observer-estimators
[AD-A151934] N85-27597
An application of Markov chains to the problem of migration in inventory systems
[AD-A151954] N85-27618
STORAGE BATTERIES
Maintenance of photovoltaic power systems
[AD-A152299] N85-27390
STORAGE RINGS (PARTICLE ACCELERATORS)
Measurement of NSLS distributed diode sputter ion pump characteristics
[DE85-06550] N85-27031
Proceedings of the Workshop on Polarized Targets in Storage Rings
[DE85-002704] N85-27653
Distortion functions
[DE85-007511] N85-27655
STORAGE STABILITY
Solid state hydrogen pumping and storage material
[AD-D011610] N85-27011
Photovoltaic powered vaccine refrigerator-freezer systems field test results
[NASA-TM-86972] N85-27386
STORMS
An evaluation of the performance of a new storm tracking methodology
[AD-A152234] N85-27484
STRAIN GAGES
A strain gauge manual
[AD-A151802] N85-27197
STRAIN MEASUREMENT
Some advances in experimentation supporting development of viscoplastic constitutive models
[NASA-CR-174855] N85-27260
STRAIN RATE
Influence of pretreatment, environment and strain rate on stress corrosion cracking of the aluminum alloy 7075-T6
[VTH-LR-433] N85-26985
STRAPDOWN INERTIAL GUIDANCE
Navigation: Accounting for copy N85-26641
Preguidance and piloting with the aid of composite inertial sensors N85-26646
Autofocus motion compensation for synthetic aperture radar and its compatibiliy with strapdown inertial navigation sensors on highly maneuverable aircraft
[AD-A151940] N85-26693
STRATEGY
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172
STRATIFICATION
Wave propagation in density stratified fluids N85-27162
STRATOSPHERE
Wave dynamics and transport in the stratosphere
[NASA-CR-175789] N85-27413
Stratospheric ClO: In-situ detection with a new approach N85-27416
The copper vapor laser N85-27417
Research and development of new instruments N85-27418
Water vapor N85-27420
Role and fate of ozone in the atmosphere N85-27421
SAM II measurements of the polar stratospheric aerosol. Volume 6: April to October 1981
[NASA-RP-1141] N85-27422
STRATUS CLOUDS
Fog advection in the Namib N85-27454
STREAM FUNCTIONS (FLUIDS)
Some numerical analyses of flows with separation N85-26616
STREAMLINED BODIES
An experimental and analytical study of the aerodynamic interference effects between two Sears-Haack bodies at Mach 2.7
[NASA-TM-85729] N85-26673
Instability of solar wind near streamlined bodies N85-26794
STRESS ANALYSIS
Impact of magnetic isolation on pointing system performance in the presence of structural flexibility
[NASA-CR-172481] N85-26861
Determination of permissible heating rate of metal
[BLL-M-36107-(5828.4)] N85-26957
In plane stress analysis
[NASA-CR-175775] N85-27259
Component-specific modeling
[NASA-CR-174765] N85-27261
STRESS CONCENTRATION
The effects of pin elasticity, clearance, and friction on the stresses in a pin-loaded orthotropic plate
[NASA-CR-175816] N85-26927
Experimentally determined distribution of stress around a horizontally loaded model pile in dense sand
[CE-43] N85-27239
In plane stress analysis
[NASA-CR-175775] N85-27259
Accuracy of the calculated stress field around a craze
[DE85-005520] N85-27272
STRESS CORROSION CRACKING
Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26928
Influence of pretreatment, environment and strain rate on stress corrosion cracking of the aluminum alloy 7075-T6
[VTH-LR-433] N85-26985
STRESS WAVES
Altimetry data and the elastic stress tensor of subduction zones
[NASA-CR-175796] N85-27425
STRESS-STRAIN RELATIONSHIPS
Fiber reinforcement of gun propellant
[AD-A152296] N85-27014

Stressed-strained state of tubular shells under uniformly distributed pressure N85-27067
Stressed state of multilayer thick-walled longitudinally corrugated cylinders N85-27069

STRUCTURAL ANALYSIS
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 1: User's manual [AD-A152268] N85-26725
A study of structural concepts for ultralightweight spacecraft [NASA-CR-175765] N85-26848
Nonlinear structural analysis for fiber-reinforced superalloy turbine blades N85-26887
Adaptation of continuous beams and the method of optimizing the flexibility of their elastic supports. Theorem on maximal adaptation loading, supplement [REPT-10/1984-SUPPL] N85-27241
Optimal modeling with a minimum of local distortion [REPT-18/1984] N85-27243
A computer analysis program for interfacing thermal and structural codes [NASA-TM-87021] N85-27264

STRUCTURAL BASINS
Preliminary assessment of climatic change during late Wisconsin time, southwest Great Basin and vicinity, Arizona, California and Nevada [DE85-008343] N85-27488

STRUCTURAL DESIGN
Structural design and kinematic configuration of two-armed robots N85-27037
Design and construction of a computer controlled mirothermocouple probe for the study of buoyant jets [AD-A152224] N85-27199
Numerical optimization algorithm for engineering problems using microcomputer [AD-A152135] N85-27554
The application of computer aided structural optimization to the design of aircraft components [MBB-UT-21/84-O] N85-27728
Some aspects of how to design cost-effective flight control systems [MBB-LKE-32/S/PUB/143] N85-27729

STRUCTURAL DESIGN CRITERIA
Synthesis study: Validation of a gust generator in the presence of a model in a wind tunnel [ONERA-RT-16/5108-RY-051] N85-26678
Bearings working group N85-26878
Hybrid bearings for LH2 and LO2 turbopumps N85-26880
Rotordynamics N85-26888
Research in the field of rib stiffened shell stability N85-27068

STRUCTURAL ENGINEERING
A study of spacecraft technology and design concepts, volume 1 [NASA-CR-172579-VOL-1] N85-26844

STRUCTURAL PROPERTIES (GEOLOGY)
Inversion of Rayleigh wave group velocities from high-explosive tests [AD-A152172] N85-27175
System of interpretation of remote sensing data when hydrocarbons are present, volume 2 [INPE-3087-TDL/162-VOL-2] N85-27326
Surface exploration geophysics applied to the Moon [DE85-006714] N85-27793

STRUCTURAL STABILITY
USSR report: Engineering and equipment [JPRS-UEQ-84-006] N85-27035
Stability of anisotropic cylindrical sandwich shells N85-27065
Research in the field of rib stiffened shell stability N85-27068
Structural stability and bifurcation in conical flow fields [VTH-LR-424] N85-27282

STRUCTURAL STRAIN
Optimal modeling with a minimum of local distortion [REPT-18/1984] N85-27243
Multinomial form of the solution of problems of the statistics of elastic rectangular disks [REPT-17/1984] N85-27244

STRUCTURAL VIBRATION
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-3, 220/May-June [ESA-TT-882] N85-26636
Internal resonance in nonlinear vibrating systems [REPT-15/1984] N85-27245

STRUCTURAL WEIGHT
A study of structural concepts for ultralightweight spacecraft [NASA-CR-175765] N85-26848

SUBDWARF STARS
Studies of hot B subdwarfs. Part 2: Energy distributions of three bright sdB/sdOB stars in the 950-5500 angstrom range [NASA-CR-175854] N85-27775

SUBROUTINES
A general purpose scatter storage subsystem and a comparison of hashing methods [NASA-CR-175814] N85-27542
Proposal for an extended set of FORTRAN Basic Linear Algebra subprograms [DE85-007241] N85-27562

SUBSONIC SPEED
A computer program for the drag prediction of subsonic, turbine powered aircraft in the en-route configuration [VTH-LR-412] N85-26681

SUBSTRATES
Investigation of basic characteristics of laser heating in thermoluminescence and of laser-stimulated luminescence [AD-A152143] N85-27212

SULFONATES
Luminescence probe studies of ionomers. 2. Steady-state measurements from sulfonated polyethylene and teflon membranes [AD-A152233] N85-27000

SUMMER
The use of radar in determining precipitation processes in the BEWMEX area N85-27455
Evaluation of the area and severity of last night's frosts [REPT-109] N85-27473

SUNSPOT CYCLE
Dependence of equatorial F-region plasma bubble rise velocity and dynamo electric field on solar cycle [INPE-3439-PRE/696] N85-27434

SUPERCOMPUTERS
Recent advances in supercomputers N85-26625
Computational plasma physics and supercomputers, revision 1 [DE85-007228] N85-27687

SUPERCONDUCTING POWER TRANSMISSION
Operational test results of a prototype superconducting power transmission system and their extrapolation to the performance of a large system [DE85-006731] N85-27153

SUPERCRITICAL AIRFOILS
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction [NASA-CR-175788] N85-26665

SUPERHIGH FREQUENCIES
Development and flight test of a helicopter, X-band, portable precision landing system concept [NASA-TM-86710] N85-26721

SUPERLATTICES
Models of long-period superstructure [DE85-007659] N85-26981

SUPERNOVAE
The soft X-ray background as a supernova blast wave viewed from inside: Solar abundance models [NASA-CR-175767] N85-27813

SUPERPLASTICITY
Characteristics and applications of superplastic materials for aeronautics [MBB-BB-565/84-O] N85-27727

SUPERSONIC FLOW
An experimental and analytical study of the aerodynamic interference effects between two Sears-Haack bodies at Mach 2.7 [NASA-TM-85729] N85-26673
Measurements of the symmetric aerodynamic coefficients for flat faced cylinders in the angle of attack regime 0 to 90 deg for transonic and supersonic speeds [FFA-TN-1984-04] N85-26675

SUPERSONIC JET FLOW
Parametric study of autooscillation upon flow of supersonic jet into cylindrical cavity N85-27060

SUPPRESSORS
Suppression of vibration effects on piezoelectric crystal resonators [AD-D011625] N85-27142

SURFACE ACOUSTIC WAVE DEVICES
Research and development of subsurface acoustic wave devices for sensor applications [AD-A152197] N85-27642

SURFACE CRACKS
Accuracy of the calculated stress field around a craze [DE85-005520] N85-27272

SURFACE DISTORTION
Lidar ER2 (ozone). Crystal characterization for harmonic conversion — laser systems [CERT-2/6129-00] N85-27717

SURFACE ENERGY
Fluorinated polyesters [AD-D011611] N85-26988

SURFACE FINISHING
MOD silver metallization for photovoltaics [NASA-CR-175773] N85-27381
Surface modification of solids [DE85-007543] N85-27715

SURFACE LAYERS
The theoretical response of a vertical line array to wind-generated noise in shallow water [AD-A151730] N85-27638

SURFACE NAVIGATION
Checking on the position of navigation marker buoys by the ARGOS system N85-27354

SURFACE PROPERTIES
Secondary ion mass spectrometry studies of solids and surfaces [AD-A151744] N85-26939
Free-surface phenomena under low- and zero-gravity conditions [NASA-CR-175835] N85-27168
Inversion of Rayleigh wave group velocities from high-explosive tests [AD-A152172] N85-27175
Surface exploration geophysics applied to the Moon [DE85-006714] N85-27793

SURFACE REACTIONS
Effects of surface chemistry on hot corrosion life [NASA-CR-174915] N85-26711

SURFACE ROUGHNESS EFFECTS
Energy reflection coefficient for H+ ions at energies between 10 and 80 keV [DE85-007547] N85-27662

SURFACE TEMPERATURE
Regularities in recent changes in surface air temperature and atmospheric precipitaion fields N85-27311
Evaluation of the area and severity of last night's frosts [REPT-109] N85-27473
Simulation of a synchronously coupled atmosphere-ocean prediction model [AD-A152020] N85-27482

SURFACE VEHICLES
Hybrid propulsion technologies for urban bus transit [PB85-157469] N85-27773

SURFACE WAVES
Results of an initial trial of a satellite telemetering buoy measuring near surface current N85-27345

SURVEILLANCE
Surveillance program for the dissection and analysis of explosive and pyrotechnic components [DE85-006105] N85-27016

SWEAT
Evaluation of a field expedient technique for sweat sample collection [AD-A151916] N85-27521

SWELLING
Swelling behavior of titanium-modified AISI 316 alloys [DE85-007470] N85-26962

SWEPT WINGS
La Recherche Aerospatiale Bimonthly Bulletin, Number 1984-4, 221/July-August [ESA-TT-884] N85-26637

SWIRLING
Turbulence characteristics of swirling flowfields [NASA-CR-174918] N85-26717

SYMBOLIC PROGRAMMING
Use of REDUCE 2 for symbolic programming [INPE-3355-PRE/633] N85-27544

SYMBOLS
Symbol stream combining in a convolutionally coded system N85-27101

SYMMETRY
Temperature: Curvature relationships for unsymmetric graphite-epoxy laminates [VPI-E-85-03] N85-26926
On residual stress in an elastic body N85-27246

SYNCHRONISM
Synchronizing heavily encoded data in bad weather N85-27099
Symbol stream combining in a convolutionally coded system N85-27101

SYNCHROTRON RADIATION
Measurement of NSLS distributed diode sputter ion pump characteristics [DE85-06550] N85-27031
A synchrotron/inverse Compton interpretation of a solar burst producing fast pulses at lambda 3 mm and hard X-rays N85-27815

SYNOPTIC METEOROLOGY
Development of a graphic system: Example using the outline of synoptic charts [INPE-3296-PRE/611] N85-27327
Fog advection in the Namib N85-27454
A graphic system for drawing synoptic maps by computer [INPE-3215-PRE/568] N85-27474
SINOGRAFO: A system for influencing and forecasting weather [INPE-3349-PRE/628] N85-27475

SYNTAX
Evaluating syntactic constraints to speech recognition in a fighter aircraft environment
[AD-A152117] N85-27119
Research in knowledge representation for natural language understanding
[AD-A152260] N85-27579
SYNTHESIS (CHEMISTRY)
Synthesis of phenols from metal-carbynes and diynes
[AD-A151913] N85-26997
SYNTHETIC APERTURE RADAR
Autofocus motion compensation for synthetic aperture radar and its compatibility with strapdown inertial navigation sensors on highly maneuverable aircraft
[AD-A151940] N85-26693
SYNTHETIC APERTURES
Synthetic aperture side-looking radar image adjustment N85-27304
SYNTHETIC FUELS
Current alternative energy research and development in Illinois
[PB85-163137] N85-27397
SYNTHETIC METALS
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26965
SYNTHETIC RESINS
Evaluation of the PSP resin as a precursor of carbon
[ONERA-RT-11/1784-M] N85-26932
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26965
SYSTEM EFFECTIVENESS
Combinatorial performance/cost analysis of an autonomous navigation system for aircraft N85-26640
Construction and functioning of extended orbital systems N85-26814
Proposal of a method for evaluating accuracy of estimated impulse response of a system N85-27024
Operational test results of a prototype superconducting power transmission system and their extrapolation to the performance of a large system
[DE85-006731] N85-27153
SYSTEM FAILURES
Determining availability characteristics of DSN data systems using discrepancy report data N85-27109
SYSTEM IDENTIFICATION
Proposal of a method for evaluating accuracy of estimated impulse response of a system N85-27024
SYSTEMS ANALYSIS
The evolutive state: A new definition of system state to include sequencing of events N85-26643
Photovoltaic powered vaccine refrigerator-freezer systems field test results
[NASA-TM-86972] N85-27386
An evaluation of thermal storage for liquid-metal, solar thermal receivers
[DE85-002929] N85-27394
Central solar heating plants with seasonal storage. Evaluation of systems concepts based on heat storage in aquifers
[DE85-006788] N85-27396
SYSTEMS COMPATIBILITY
The evolutive state: A new definition of system state to include sequencing of events N85-26643
SYSTEMS ENGINEERING
Design adequacy: An effectiveness factor N85-26642
The evolutive state: A new definition of system state to include sequencing of events N85-26643
Simulation: A tool for cost-effective systems design and live test reduction N85-26657
Cost-effective missile guidance through distributed architecture and standard processes N85-26662
Technical evaluation report on the Flight Mechanics Symposium on Active Control Systems: Review, Evaluation and Projections
[AGARD-AR-220] N85-26730
X-29A digital flight control system design N85-26736
ACT flight research experience N85-26741
Operational and developmental experience with the F/A-18A digital flight control system N85-26742
Flight testing and development of the F/A-18A digital flight control system N85-26743
Construction and functioning of extended orbital systems N85-26814
Spacecraft configuration study for second generation mobile satellite system
[NASA-CR-175774] N85-26849
Historical perspectives on information transmission engineering N85-27023
Automated CPX support system preliminary design phase
[NASA-CR-175784] N85-27091
Fatigue criterion to system design, life and reliability
[NASA-TM-87017] N85-27226
Development of graphical time response using the OPTSYSX program
[AD-A152221] N85-27557
Evaluation of Ada (trademark) as a communications programming language, volume 1
[AD-A152314] N85-27559
SYSTEMS MANAGEMENT
Management aspects of software maintenance
[AD-A152035] N85-27550
Management control systems and interdependencies: An empirical study
[AD-A152280] N85-27746
SYSTEMS SIMULATION
Simulation: A tool for cost-effective systems design and live test reduction N85-26657
A description of the process of elaborating man-machine dialog in an aircraft equipped with cathode tubes: Roles and specifications of piloted simulation methods N85-26658

T

TABLES (DATA)
Summary of Meteorological Observations, Surface (SMOS), Dallas, Texas
[AD-A150599] N85-27480
TAIL ASSEMBLIES
Description of a computer program treating transonic steady state aeroelastic effects for a canard or tail airplane
[FFA-TN-1983-23] N85-26674
TAKEOFF
The use of pressure sensing tape on the aircraft wing as sensor for flight control systems N85-26660
Probabilistic computer model of optimal runway turnoffs
[NASA-CR-172549] N85-26760
TAKEOFF RUNS
Probabilistic computer model of optimal runway turnoffs
[NASA-CR-172549] N85-26760
TAPE RECORDERS
Operation of autotracking system in various video playback modes N85-27055
TARGET ACQUISITION
Optmizing the specifications for an air-surface laser system N85-26644
TARGET RECOGNITION
Design adequacy: An effectiveness factor N85-26642
Scene analysis using recursive frequency domain correlation with energy normalization
[AD-A151777] N85-27596
A mathematical model for calculating detection probability of a diffusion target
[AD-A152026] N85-27601
TARGET THICKNESS
A method for the evaluation of the residual energy of a metallic fragment after perforation of a thin target
[ISL-R-113/83] N85-27233
TASKS
Shape with and without redundant colour as coding mechanism for simulated radar displays in a time-extended simple vigilance task
[AD-A151683] N85-27533
TAXIING
A feasibility study for using low boiling point fluids to change aircraft tire deflection
[AD-A152096] N85-26701
TAYLOR SERIES
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172
TECHNOLOGICAL FORECASTING
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762
TECHNOLOGIES
A study of spacecraft technology and design concepts, volume 1
[NASA-CR-172579-VOL-1] N85-26844
TECHNOLOGY ASSESSMENT
Protective coatings for aircraft structures: A review
[VTH-LR-413] N85-26704
The state-of-the-art and future of flight control systems N85-26732
Forecasts on long-range development of space programs N85-26830
US said to seek military advantage in space N85-26831
Instrumentation technology overview N85-26903
East Europe report: Science and technology
[JPRS-ESA-85-019] N85-27077
Preliminary technology utilization assessment of the robotic fruit harvester
[NASA-CR-175834] N85-27532
Flight test support aircraft Advanced Technologies Testing Aircraft System (ATTAS) for the DFVLR
[MBB-FE-732/S/PUB/154] N85-27730
The Helios missions N85-27795
TECHNOLOGY TRANSFER
China report: Science and Technology
[JPRS-CST-85-012] N85-27300
Bioengineering and rehabilitation: Windows of opportunity past, present and future
[NASA-EP-216] N85-27516
Soviet space programs, 1976-1980 (with supplementary data through 1983). Part 3: Unmanned space activities
[S-PRT-98-235-PT-3] N85-27765
The significance of Helios for Europe N85-27808
TECHNOLOGY UTILIZATION
Aspects of application of ACT systems for pilot workload alleviation N85-26734
Uses of laser technology described N85-27080
Function of remote sensing in Brazil
[INPE-3314-PRE/621] N85-27329
Status of computer aided mapping in hydrographic services N85-27366
Surveying and optical tooling technologies combined to align a skewed beamline at the LAMPF accelerator
[DE85-005902] N85-27664
Characteristics and applications of superplastic materials for aeronautics
[MBB-BB-565/84-O] N85-27727
TECTONICS
Analysis of mesofissuring on space photographs: New technique for study of petroleum and gas deposits N85-26828
TELECOMMUNICATION
The Record of Electrical and Communication Engineering Conversazione, volume 53, no. 2, November 1984
[ISSN-0385-7719] N85-27022
Historical perspectives on information transmission engineering N85-27023
Optical non-line-of-sight covert, secure high data communication system
[AD-D011607] N85-27087
Satellite provided customer promises services, a forecast of potential domestic demand through the year 2000. Volume 4: Sensitivity analysis
[NASA-CR-174862] N85-27092
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762
National Telecommunications and Information Administration authorization
[GPO-38-660] N85-27766
TELEMETRY
Present stage of utilization of the ARGOS system by the ORSTOM hydrological service for hydrometric data collection N85-27348
Use of a network of telemetered meteorological stations for prediction of the distribution of an atmospheric tracer N85-27458
TELESCOPES
Stress analysis of the space telescope focal plane structure joint
[NASA-CR-175797] N85-27284
TELEVISION EQUIPMENT
Welder training/welder testing
[BLL-WI-TRANS-683-(9312.57)] N85-27223
TEMPERATURE
Monthly and seasonal weather outlook for mid-January to mid-February 1985, volume 39, number 2, January 15, 1985
[PB85-164572] N85-27500
Monthly and seasonal weather outlook for February 1985, volume 39, number 3, January 30, 1985
[PB85-159424] N85-27502
TEMPERATURE DEPENDENCE
Special features of the temperature dependence of the capillary constant in the vicinity of the critical point
[BLL-T6438/BG/LRS/LRST750/85] N85-27632
TEMPERATURE EFFECTS
Qualification of a wall gage for the SIMA wagon, adapted to the test of half models motorized by compressed air turbines — SIMA wind tunnel
[ONERA-PV-1/8068-GY] N85-26677
Ca-Ga, Sr-Ga and Ba-Ga binary systems
[DE85-006454] N85-26980
Screening ceramic materials for intense radiant heat applications
[DE85-006989] N85-27006
Thermal consequences of localized SAR from RFR exposures N85-27130
Effects of temperature on remotely sensed mafic mineral absorption features N85-27323

TEMPERATURE GRADIENTS
Scheme for atmospheric thermal sensing from satellites with enhanced vertical resolution N85-26823
TEMPERATURE MEASUREMENT
The validation of sea surface temperatures determined from AVHRR data using in situ data recovered via system ARGOS N85-27342
Observations of airglow O2(1-Sigma) atmospheric band at 8645 A and the rotational temperature at 23 deg S [INPE-3378-PRE/653] N85-27435
TEMPERATURE PROFILES
Acoustic propagation in a thermally stratified atmosphere
[NASA-CR-175787] N85-27636
TEMPORAL DISTRIBUTION
Elemental analysis of aerosols in Transvaal urban and power-producing areas using time and size-resolved samples N85-27443
TEMPORAL RESOLUTION
Time-resolving electron temperature diagnostic for ALCATOR C
[DE85-004916] N85-27690
TENSILE STRENGTH
Magnetic method of inspecting mechanical properties of general purpose tubes
[BLL-M-36084-(5828.4)] N85-27235
Mechanical properties of lunar materials under anhydrous, hard vacuum conditions: Applications of lunar glass structural components
[DE85-006682] N85-27271
TENSILE STRESS
Determination of permissible heating rate of metal
[BLL-M-36107-(5828.4)] N85-26957
Magnetic method of inspecting mechanical properties of general purpose tubes
[BLL-M-36084-(5828.4)] N85-27235
TENSILE TESTS
Magnetic method of inspecting mechanical properties of general purpose tubes
[BLL-M-36084-(5828.4)] N85-27235
TENSIOMETERS
A strain gauge manual
[AD-A151802] N85-27197
TENSOR ANALYSIS
Alternatives for jet engine control
[NASA-CR-175831] N85-26713
Alternatives for jet engine control
[NASA-CR-175832] N85-26714
Alternatives for jet engine control
[NASA-CR-175833] N85-26715
TERMINAL BALLISTICS
A method for the evaluation of the residual energy of a metallic fragment after perforation of a thin target
[ISL-R-113/83] N85-27233
TERMINAL GUIDANCE
AN investigation into the control limitations of a bank to turn missile in the terminal homing phase
[AD-A152193] N85-26696
Dispersion sensitivity of the eight inch advanced ramjet munitions technology projectile due to wind and minor thrust errors
[AD-A152145] N85-26835
TERNARY SYSTEMS
Dual species ion implantation of ternary compounds based on In-Ga-As
[AD-D011617] N85-27698
TERRAIN
Radar return from vegetation covered terrains
[INPE-3470-PRE/713] N85-27093
A study of the effect of gently varying terrain on atmospheric flow near the surface N85-27411
TEST FIRING
Detonation velocity measurements of the explosives Detasheet C and Amatol
[AD-A152298] N85-27015
TETHERED SATELLITES
The investigation of tethered satellite system dynamics
[NASA-CR-175855] N85-26854
TETHERLINES
Stratospheric ClO: In-situ detection with a new approach N85-27416
TEXAS
Report on regional groundwater flow modeling for the Palo Duro Basin, Texas
[DE85-007490] N85-27370
THEMATIC MAPPING
CNPq/INPE LANDSAT system: Report of activities from October 1, 1983 to September 30, 1984 — Brazil
[E85-10097] N85-27318
Shuttle imaging radar-A (SIR-A) data analysis — geology of the Ozark Plateau of southern Missouri, land use in western Illinois, and vegetation types at Koonamore Station, Australia
[NASA-CR-175785] N85-27324
Raster or vector processing. Experience with the application of programs for the construction of thematic maps with boundary design in the Lower Saxony (West Germany) Land Administration for ground research N85-27365
THEORETICAL PHYSICS
Field near the front of a signal in a waveguide accomplished with dispersive plasma
[REPT-11/1984] N85-27083
THERMAL BATTERIES
Robotic thermal battery pellet fabrication
[DE85-007755] N85-27154
THERMAL CONDUCTIVITY
Directional thermal conductivities of graphite-epoxy composites: 0/90 and 0/+ or - 45/90
[AD-A152209] N85-26929
Characterization-curing-property studies of HBRF 55A resin formulations
[NASA-CR-175836] N85-26989
Conducting a thermal conductivity survey
[NASA-CR-175792] N85-27166
THERMAL CONTROL COATINGS
Rocket thrust chamber thermal barrier coatings N85-26867
Vacuum plasma coatings for turbine blades N85-26869
THERMAL CYCLING TESTS
Rocket thrust chamber thermal barrier coatings N85-26867
THERMAL DISSOCIATION
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe
[NASA-CR-174840] N85-27012
THERMAL ENVIRONMENTS
Thermal annealing of Fe implanted Al2O3 in oxidizing and reducing environment: Revised version
[DE85-007546] N85-26983
The study of thermal forecasting for gliding N85-27453
THERMAL INSULATION
Development of a polystyrene insulation system
[DE85-006950] N85-27180
THERMAL PROTECTION
Development of acceptance criteria for batches of silane primer for external tank thermal protection system bonding applications
[NASA-CR-175850] N85-26995
THERMAL STABILITY
Simulation studies for surfaces and materials strength
[NASA-CR-175766] N85-27262
THERMAL STRESSES
Thrust chamber life prediction N85-26865
THERMOCOUPLES
Design and construction of a computer controlled microthermocouple probe for the study of buoyant jets
[AD-A152224] N85-27199
THERMODYNAMIC PROPERTIES
Development of new materials for turbopump bearings N85-26877
Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967
Computer program for the calculation of multicomponent convective diffusion deposition rates from chemically frozen boundary layer theory
[NASA-CR-168329] N85-27164
Design and construction of a computer controlled microthermocouple probe for the study of buoyant jets
[AD-A152224] N85-27199
The study of thermal forecasting for gliding N85-27453
Thermal and magnetic properties of neutron stars N85-27774
THERMODYNAMICS
Analytical fuel property effects--small combustors
[NASA-CR-174738] N85-26709
Study of the kinetics and thermodynamics of hydrogen in Pd-based alloys
[DE85-007341] N85-26969
Eigenvalue approximation methods for quantum lattice Hamiltonians N85-27627
THERMOELECTRIC GENERATORS
LPCVD tungsten deposition on Si-Ge alloy
[DE85-005588] N85-26970
THERMOLUMINESCENCE
Investigation of basic characteristics of laser heating ip thermoluminescence and of laser-stimulated luminescence
[AD-A152143] N85-27212
THERMOMECHANICAL TREATMENT
Multiaxial and thermomechanical fatigue considerations in damage tolerant design
[NASA-TM-87022] N85-26964
THERMOMETERS
Fiber optic Raman thermometer for Space Shuttle main engine preburner profiling N85-26904
THERMOSETTING RESINS
NASA/aircraft industry standard specification for graphite fiber toughened thermoset resin composite material
[NASA-RP-1142] N85-26923
THERMOSPHERE
Mechanism of formation of low temperatures in nighttime Venusian thermosphere N85-26807
Thermospheric winds observed by OI6300A Doppler shifts at 23 deg S in the Brazilian sector
[INPE-3384-RPE/470] N85-27479
THESAURI
Energy data base: Subject thesaurus
[DE84-010568] N85-27761
THICK FILMS
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26965
MOD silver metallization for photovoltaics
[NASA-CR-175773] N85-27381
THICK PLATES
Method of fabricating acceleration resistant crystal resonators and acceleration resistant crystal resonators so formed
[AD-D011630] N85-27145
The nonlinear analysis of thick composite plates using a cubic spline function N85-27252
THIN PLATES
The effect of low sheet thicknesses on the fracture toughness of an Al alloy (7075-T6) — Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-425] N85-26984
A method for the evaluation of the residual energy of a metallic fragment after perforation of a thin target
[ISL-R-113/83] N85-27233
THIN WINGS
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 2: Final report on program enhancement and delivery
[AD-A152269] N85-26726
THREAT EVALUATION
Generation of flight paths using heuristic search
[AD-A151949] N85-26694
Fiber reinforcement of gun propellant
[AD-A152296] N85-27014
THREE BODY PROBLEM
Integrable cases of restricted doubly averaged 3-body problem N85-26778
The 6 pi-periodic solutions of plane restricted elliptical 3-body problem in neighborhood of libration points N85-26779
Configuration space Faddeev calculations
[DE85-005813] N85-27721
THREE DIMENSIONAL BOUNDARY LAYER
Three-dimensinal wing boundary layer analysis program BLAY and its application N85-26632
THREE DIMENSIONAL FLOW
Two computational methods for cascade flows N85-26617
Numerical example of three-dimensional flying object in shockless transonic flow N85-26623
Turbulence characteristics of swirling flowfields
[NASA-CR-174918] N85-26717
Study of the primary zone of gas turbine hearths
[ONERA-RTS-22/3256-EY] N85-26719
Numerical analysis of flow non-uniformity in the hot gas manifold of the Space Shuttle main engine N85-26899
Fuel and oxidizer turbine loss analysis N85-26900
Redistribution of the inlet temperature profile through the SSME fuel turbine N85-26901
Report on regional groundwater flow modeling for the Palo Duro Basin, Texas
[DE85-007490] N85-27370
THRESHOLDS
An evaluation of discretized conditional probability and linear regression threshold techniques in model output statistics forecasting of visibility over the north Atlantic Ocean
[AD-A151955] N85-27619
THROTTLING
Nonintrusive shaft speed sensor N85-26908
THUNDERSTORMS
Comparison of wind velocity in thunderstorms determined from measurements by a ground-based Doppler radar and an F-106B airplane
[NASA-TM-86348] N85-26687
Fluid-dynamic model of a downburst
[UTIAS-271] N85-27441
TIME DEPENDENCE
Identification and control of structures in space
[NASA-CR-175790] N85-26850
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172

Some advances in experimentation supporting development of viscoplastic constitutive models [NASA-CR-174855] N85-27260
Evaluation of an algorithm for the solution of the time-dependent Euler equations [AD-A151993] N85-27600
Optimum convection conditions for Czochralski growth of semiconductors [INPE-3395-PRE/665] N85-27703

TIME LAG
Digital RF delay line for ECM (electronic countermeasure) look-through [AD-A152120] N85-27120
Topics in time delay estimation [AD-A152231] N85-27607

TIME MARCHING
Thermodynamic evaluation of transonic compressor rotors using the finite volume approach [NASA-CR-175811] N85-26712

TIME MEASUREMENT
Analysis of short-period changes in intensity of hard X-radiation of solar flares registered aboard Venera-13 and Venera-14 spacecraft N85-26806

TIME SERIES ANALYSIS
Study of longitudinal landing flying qualities evaluation using pilot model theory [AD-A152194] N85-26702
A Markov method for simulating non-Gaussian wind speed time series [DE85-007131] N85-27485

TIME SIGNALS
Maintenance of time and frequency in the DSN using the global positioning system N85-27105

TIROS N SERIES SATELLITES
Long term drifting float for measuring mean oceanic circulation using ARGOS system N85-27339
Availability of the ARGOS system based on the orbital characteristics of the TIROS-N satellites — oceanographic/meteorological data N85-27352
Location and data collection satellite system ARGOS. User's guide — satellite based localization N85-27371

TITANIUM
Hydrogen induced crack growth in Grade-12 Titanium [BNL-NUREG-35598] N85-26976
Experimental investigation of the pulsed photoacoustic effect produced on a solid surface [AD-A152114] N85-27640

TITANIUM ALLOYS
Solid state bonding of molybdenum and TZM [BLL-T6439/BG/LRS/LRST751/85] N85-27220

TOKAMAK DEVICES
Ballooning beta limits of dee and bean shaped Tokamaks [IPPJ-713] N85-27676
TOKASTAR: A Tokamak stellarator hybrid with possible bean-shaped operation [IPPJ-718] N85-27680
Computational plasma physics and supercomputers, revision 1 [DE85-007228] N85-27687
Spherical torus, compact fusion at low field [DE85-006983] N85-27689
Time-resolving electron temperature diagnostic for ALCATOR C [DE85-004916] N85-27690
A four-field model for Tokamak plasma dynamics [DE85-007111] N85-27694
Coupled plasma-neutral transport model for the scrape-off region [DE85-007559] N85-27695
Tokamak systems code [DE85-008147] N85-27696

TOLERANCES (MECHANICS)
Multiaxial and thermomechanical fatigue considerations in damage tolerant design [NASA-TM-87022] N85-26964

TOLERANCES (PHYSIOLOGY)
Effects of dehydration or cold exposure and restricted fluid intake upon cognitive performance [AD-A151973] N85-27525

TOPEX
Topex Gravity Model Development Team activities during fiscal year 1984 [NASA-TM-86208] N85-27285
Status of the observational data sets — TOPEX N85-27286
Satellite selection criteria N85-27288
Optical best arc RMS test results N85-27290
Ocean tide models for Topex analysis N85-27291
Radial orbit error spectrum for Topex N85-27292
The size of a gravitational field model for Topex N85-27293
Numerical integration through force discontinuities: Solar radiation pressure N85-27296
Station coordinates and Earth rotation parameters from Lageos laser ranging N85-27299

TOPOGRAPHY
Tenth Conference of Working Group of Socialist Countries on Remote Sensing of Earth under Intercosmos Program N85-26820
Reports on cartography and geodesy. Series 1: Original reports, no. 94 [ISSN-0469-4236] N85-27357
Use of vector processors in cartographic raster data processing, with special regard to the AP-120B vector processor N85-27358
Testing of scanner-assisted revision of the topographic map 1:25,000 (TK 25) N85-27359
Automatic engraving of map frames in the revision of the TK 25, 1:25,000 topographical map N85-27362
Groundwater model for an island aquifer: Bribie Island groundwater study [CE-44] N85-27398

TOPOLOGY
Mathematical programming in computer network design [AD-A152275] N85-27558
A study of topologies and protocols for fiber optic local area network [NASA-CR-175771] N85-27669

TORNADOES
Hurricane Research Division, fiscal year 1984 programs, fiscal year 1985 projections N85-27491

TOROIDAL PLASMAS
Spherical torus, compact fusion at low field [DE85-006983] N85-27689
Time-resolving electron temperature diagnostic for ALCATOR C [DE85-004916] N85-27690

TORSION
Fatigue damage and small crack growth during biaxial loading N85-27247

TORSIONAL STRESS
An improved torsional method for determining the fracture toughness of stiff materials and of adhesive joints [AD-A152091] N85-27267

TORSO
Torso restraint system [AD-D011609] N85-26684

TOUGHNESS
Simultaneous chemical vapor deposition of SiC-dispersed phase composites [DE85-007751] N85-26931

TOXICOLOGY
Role and fate of ozone in the atmosphere N85-27421

TOXINS AND ANTITOXINS
Structural-functional changes in bacterial cells under spaceflight conditions N85-26812

TRACE ELEMENTS
Upper-air data collection during CAPTEX [DE85-006300] N85-27438
Use of a network of telemetered meteorological stations for prediction of the distribution of an atmospheric tracer N85-27458

TRACKING (POSITION)
Automatic tracking of crack growth via finite elements N85-27246
An evaluation of the performance of a new storm tracking methodology [AD-A152234] N85-27484

TRAILING EDGES
Turbulent flow of fluid near trailing edge of plate in stream at zero angle of attack N85-27057

TRAINING EVALUATION
A review of safety practices and safety training for the explosives field [AD-A152295] N85-27028
Welder training/welder testing [BLL-WI-TRANS-683-(9312.57)] N85-27223

TRAJECTORIES
Dispersion sensitivity of the eight inch advanced ramjet munitions technology projectile due to wind and minor thrust errors [AD-A152145] N85-26835

TRAJECTORY MEASUREMENT
Method for evaluating perturbation in algorithms for solving navigational problems N85-26783

TRANSDUCERS
A transduction path method of solid state sensor analysis and investigation [AD-A152123] N85-27707

TRANSFER FUNCTIONS
Development of graphical pole-zero, root-locus, Bode, Nyquist, and Nichols responses using the OPTSYSX program [AD-A152148] N85-27555

TRANSFER ORBITS
Analysis of orbit transfer vehicles for GPS Block 3 satellites [AD-A152021] N85-26860

TRANSIENT LOADS
Transient behavior of a single-blade horizontal-axis wind turbine [MBB-UD-421/84-O] N85-27737

TRANSITION METALS
Transitional metal activation and functionalization of C-H bonds [DE85-006816] N85-26949
Survey of experimental and theoretical electron-impact ionization cross sections for transition metal ions in low stages of ionization [DE85-007605] N85-27658

TRANSITION PROBABILITIES
Sensitivity of conditions for lumping finite Markov chains [AD-A152122] N85-27604

TRANSMISSION EFFICIENCY
Meteorological factors in Earth-Satellite propagation [NASA-CR-175764] N85-27089

TRANSMISSION LINES
Asymptotic solutions of MHD equations with finite conductivity [REPT-12/1984] N85-27581

TRANSMISSION LOSS
Development of a modified time delay spectrometry technique for underwater acoustic measurements in a multipath environment [AD-A152111] N85-27639

TRANSMITTERS
Digital RF delay line for ECM (electronic countermeasure) look-through [AD-A152120] N85-27120
A communications link for an implantable electrode array [AD-A152238] N85-27510

TRANSONIC FLOW
Numerical analyses in aerodynamic design of aero-engine fan N85-26618
Numerical example of three-dimensional flying object in shockless transonic flow N85-26623
A numerical design method for three-dimensional transonic wings N85-26631
Description of a computer program treating transonic steady state aeroelastic effects for a canard or tail airplane [FFA-TN-1983-23] N85-26674
Measurements of the symmetric aerodynamic coefficients for flat faced cylinders in the angle of attack regime 0 to 90 deg for transonic and supersonic speeds [FFA-TN-1984-04] N85-26675
Numerical solution of transonic normal shock wave-boundary layer interaction using the Bohning-Zierop model — wind tunnel flow [VTH-LR-416] N85-26683

TRANSONIC FLUTTER
Numerical simulation of transonic flutter of a high-aspect ratio transport wing N85-26630

TRANSONIC WIND TUNNELS
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction [NASA-CR-175788] N85-26665
A curved test section for research on transonic shock wave-boundary layer interaction [VTH-LR-414] N85-26682
Study on needs for a magnetic suspension system operating with a transonic wind tunnel [NASA-CR-3900] N85-26759

TRANSPORT AIRCRAFT
Demonstration of relaxed stability on a commercial transport N85-26745
Realisation of relaxed static stability on a commercial transport N85-26746
Wing buffeting active control testing on a transport aircraft configuration in a large sonic tunnel N85-26750
How to handle failures in advanced flight control systems of future transport aircraft N85-26752

TRANSPORT PROPERTIES
Electrical resistivity in amorphous metals: Consequences of phonon ineffectiveness in the diffraction model [AD-A152130] N85-27150
Computer program for the calculation of multicomponent convective diffusion deposition rates from chemically frozen boundary layer theory [NASA-CR-168329] N85-27164
Coupled plasma-neutral transport model for the scrape-off region [DE85-007559] N85-27695
Polycrystalline semiconductor heterojunction modelling (CdS/CuInSe(sub)2) [DE85-002913] N85-27713

TRANSPORTATION ENERGY
Hybrid propulsion technologies for urban bus transit [PB85-157469] N85-27773

TRANSVERSE WAVES
Transverse periodic boundary conditions in molecular dynamics with uniaxial strain shock waves
[DE85-006497] N85-27656
TRAVELING WAVES
Dynamic response of shells and plates subjected to variable magnitude traveling loads N85-27250
TRAYS
A robotic system for preparing reagent and dilution vials
[DE85-008262] N85-27231
TREES (PLANTS)
Use of forest modeling to project acid rain effects
[DE85-005251] N85-27400
Interactive effects of acid rain and gaseous air pollutants on natural terrestrial vegetation
[DE85-005255] N85-27401
TRIANGULATION
The 6 pi-periodic solutions of plane restricted elliptical 3-body problem in neighborhood of libration points N85-26779
Standards and specifications for geodetic control networks
[PB85-166478] N85-27374
TRIBOLOGY
Effect of counterface material type and its topography on the tribological properties of polyimide composites
[NASA-TM-87036] N85-26993
TROPICAL METEOROLOGY
Tropical Oceans-Global Atmosphere (TOGA) experiment planning for the Brazilian participation in TOGA global climate program
[INPE-3499-PRE/735] N85-27477
TROPICAL STORMS
Forecast of Atlantic seasonal hurricane activity for 1985 N85-27470
Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones
[PB85-164994] N85-27499
TROPOSPHERE
An investigation of tropospheric ions N85-27412
Radon concentration inversion in the troposphere: Still unexplained
[INPE-3360-PRE/638] N85-27431
The seasonal cycle of atmospheric CO in the Southern Hemisphere N85-27447
TSUNAMI WAVES
Atmospherically forced, coastally trapped, long period gravity waves off the south coast of southern Africa N85-27461
TUMBLING MOTION
Optimal open loop and nonlinear feedback control for remote orbital capture
[AD-A151967] N85-26859
TUNABLE LASERS
Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208
TUNGSTEN
LPCVD tungsten deposition on Si-Ge alloy
[DE85-005588] N85-26970
Positron annihilation studies of vacancy formation in tungsten, chromium, and niobium
[DE85-006837] N85-27710
TURBINE BLADES
Advanced High Pressure O2/H2 Technology
[NASA-CP-2372] N85-26862
Vacuum plasma coatings for turbine blades N85-26869
Material technology N85-26870
Design overview of fiber-reinforced superalloy composites for the Space Shuttle main engine N85-26871
Materials for advanced rocket engine turbopump turbine blades N85-26872
High-pressure hydrogen testing of single crystal superalloys for advanced rocket engine turbopump turbine blades N85-26875
Turbine blade friction damping study N85-26886
Nonlinear structural analysis for fiber-reinforced superalloy turbine blades N85-26887
Redistribution of the inlet temperature profile through the SSME fuel turbine N85-26901
Reusable rocket engine turbopump condition monitoring N85-26907
Response of a wind turbine blade to seismic and turbulent wind excitations N85-27375
TURBINE ENGINES
ignition/combustion processes N85-26909
TURBINE PUMPS
Advanced High Pressure O2/H2 Technology
[NASA-CP-2372] N85-26862
Ceramics for advanced O2/H2 application N85-26868
Design overview of fiber-reinforced superalloy composites for the Space Shuttle main engine N85-26871
Materials for advanced rocket engine turbopump turbine blades N85-26872
Development of new materials for turbopump bearings N85-26877
Bearings working group N85-26878
Advanced rocket engine cryogenic turbopump bearing thermal model N85-26879
Hybrid bearings for LH2 and LO2 turbopumps N85-26880
Rolling contact fatigue life of chromium ion plated 440C bearing steel N85-26882
Signal analysis techniques for incipient failure detection in turbomachinery N85-26884
Turbine blade friction damping study N85-26886
Preliminary results on passive eddy current damper technology for SSME turbomachinery N85-26890
Damping seal verification setup N85-26893
Damping seals for turbomachinery N85-26894
Vibration characteristics of the HPOTP (High Pressure Oxygen Turbopump) of the SSME (Space Shuttle Main Engine) N85-26895
Analytical study of flow phenomena in SSME turnaround duct geometries N85-26902
Reusable rocket engine turbopump condition monitoring N85-26907
Nonintrusive shaft speed sensor N85-26908
TURBINE WHEELS
Properties and microstructures for dual alloy combinations of three superalloys with alloy 901
[NASA-TM-86987] N85-26963
Aerodynamic forces developing in channels between vases in turbine drive wheels N85-27062
TURBINES
Exploratory wind-tunnel investigation of a wingtip-mounted vortex turbine for vortex energy recovery
[NASA-TP-2468] N85-26667
Qualification of a wall gage for the SIMA wagon, adapted to the test of half models motorized by compressed air turbines --- SIMA wind tunnel
[ONERA-PV-1/8068-GY] N85-26677
Water brake convertor: A simple device to convert mechanical energy into heat energy
[DE85-006021] N85-26766
Fuel and oxidizer turbine loss analysis N85-26900
USSR report: Engineering and equipment
[JPRS-UEQ-84-006] N85-27035
Quasi-steady vibrations of a rotating shaft grazing an obstacle: Spiral vibration
[BLL-CE-TRANS-7962-(9022.09)] N85-27256
TURBOFAN AIRCRAFT
Aerodynamic detuning analysis of an unstalled supersonic turbofan cascade
[NASA-TM-87001] N85-26670
A computer program for the drag prediction of subsonic, turbine powered aircraft in the en-route configuration
[VTH-LR-412] N85-26681
TURBOJET ENGINES
Preliminary wind tunnel study of the influence of a jet on the unsteady aerodynamics of a turbojet engine
[ONERA-RT-12/5115-RY-230-R-231G] N85-26679
TURBOMACHINERY
Material technology N85-26870
Monitoring of turbo-machines by shaft vibration measurement
[BLL-TRANS-7900-(9022.09)] N85-27255
TURBOPAUSE
Turbopause as source of internal gravity waves N85-27314
TURBOPROP AIRCRAFT
A computer program for the drag prediction of subsonic, turbine powered aircraft in the en-route configuration
[VTH-LR-412] N85-26681
TURBOPROP ENGINES
Fatigue life analysis of a turboprop reduction gearbox
[NASA-TM-87014] N85-27228
TURBULENCE
Observations, theoretical ideas and modeling of turbulent flows: Past, present and future
[NASA-TM-86679] N85-27167
A Markov method for simulating non-Gaussian wind speed time series
[DE85-007131] N85-27485
TURBULENT BOUNDARY LAYER
Thermodynamic evaluation of transonic compressor rotors using the finite volume approach
[NASA-CR-175811] N85-26712
An experimental study of compressible turbulent reattaching free shear layers N85-27161
Vortex studies relating to boundary layer turbulence and noise
[NASA-TM-87475] N85-27169
Theoretical investigation of three-dimensional shock wave turbulent boundary layer interactions. Part 3
[AD-A152251] N85-27177
An experimental investigation of the interaction between a shock wave and a turbulent boundary layer on a convex wall
[VTH-LR-428] N85-27187
TURBULENT FLOW
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-3, 220/May-June
[ESA-TT-882] N85-26636
Low Reynolds number vehicles
[AGARD-AG-288] N85-26666
Rotor blade flap-lag stability and response in forward flight in turbulent flows N85-26698
Thermodynamic evaluation of transonic compressor rotors using the finite volume approach
[NASA-CR-175811] N85-26712
Confined turbulent swirling recirculating flow predictions
[NASA-CR-174917] N85-26716
Turbulence characteristics of swirling flowfields
[NASA-CR-174918] N85-26717
Turbulent flow of fluid near trailing edge of plate in stream at zero angle of attack N85-27057
Observations, theoretical ideas and modeling of turbulent flows: Past, present and future
[NASA-TM-86679] N85-27167
Dynamic response of fluid transmission lines
[AD-A151926] N85-27171
Study of the coupling between average, coherent and turbulent fields in a circular excited free jet
[ISL-R-115/83] N85-27184
Computation model of turbulent free flow: Application to axisymmetric jets
[ISL-R-126/83] N85-27185
The development of a computational model for a two-dimensional turbulent flow. Part 1: Mathematical background --- solid fuel combustion
[VTH-LR-436-PT-1] N85-27188
A study of the effect of gently varying terrain on atmospheric flow near the surface N85-27411
TURBULENT HEAT TRANSFER
Design and construction of a computer controlled mirothermocouple probe for the study of buoyant jets
[AD-A152224] N85-27199
TURBULENT WAKES
Development of a rotor wake-vortex model, volume 1
[NASA-CR-174849] N85-26668
TWINNING
Method of fabricating acceleration resistant crystal resonators and acceleration resistant crystal resonators so formed
[AD-D011630] N85-27145
TWO DIMENSIONAL FLOW
The development of a computational model for a two-dimensional turbulent flow. Part 1: Mathematical background --- solid fuel combustion
[VTH-LR-436-PT-1] N85-27188
TWO PHASE FLOW
Measurements of two-phase exhaust flow parameters of a small caliber gun associated with muzzle flash phenomena
[ISL-CO-212/83] N85-27182
TYPE 3 BURSTS
Evidence concerning the generation mechanism of solar type 3 radio bursts N85-27802
TYPHOONS
Hurricane Research Division, fiscal year 1984 programs, fiscal year 1985 projections N85-27491

U

U.S.S.R.
USSR report: Space
[JPRS-USP-85-004] N85-26772
Study and mapping of anthropogenic effect on environment in different regions of USSR on basis of space photographs N85-26824
USSR report: Engineering and equipment
[JPRS-UEQ-84-006] N85-27035
Cloud-seeding for regulating precipitaion in Moscow area N85-27308
U.S.S.R. SPACE PROGRAM
Forecasts on long-range development of space programs N85-26830
International cooperation in space exploration N85-27079
Soviet space programs, 1976-1980 (with supplementary data through 1983). Part 3: Unmanned space activities
[S-PRT-96-235-PT-3] N85-27765

UH-1 HELICOPTER
Navigation and flight director guidance for the NASA/FAA helicopter MLS curved approach flight test program
[NASA-CR-177350] N85-26691
ULTRAHIGH FREQUENCIES
Optimal frequencies for broadcast transmitters in the UHF domain: Report
[TUM-M8404] N85-27088
A phase modulation evaluation procedure for an ARGOS type signal N85-27336
ULTRALIGHT AIRCRAFT
Parachute extraction device for ultralight gliders
[CH-643499-A5] N85-26663
ULTRASONIC FLAW DETECTION
Nondestructive tests of ceramic components for aircraft turbines N85-26718
Echo-response from crack-like two-dimensional reflectors in focused ultrasonic fields. Ultrasonic crack tip method for the determination of crack depth
[BLL-BISI-22062-(9022.06)] N85-27236
Ultrasonic testing of carbon fiber reinforced plastics (CFRP) using pattern recognition methods
[MBB-BB-563/84-0] N85-27726
ULTRASONIC TESTS
Ultrasonic dispersion of soils for routine particle size analysis: Recommended procedures
[DE85-005530] N85-27643
ULTRASONICS
Evaluation of experimental epoxy monomers
[NASA-TM-87476] N85-26996
Creating a Mobile Autonomous Robot Research System (MARRS)
[AD-A151963] N85-27229
ULTRAVIOLET ABSORPTION
Ground-based remote sensing of atmospheric pollution N85-27462
ULTRAVIOLET SPECTROMETERS
French and West German equipment for Vega Project N85-26805
Ground-based remote sensing of atmospheric pollution N85-27462
Studies of hot B subdwarfs. Part 2: Energy distributions of three bright sdB/sdOB stars in the 950-5500 angstrom range
[NASA-CR-175854] N85-27775
UNDERWATER ACOUSTICS
Development of a modified time delay spectrometry technique for underwater acoustic measurements in a multipath environment
[AD-A152111] N85-27639
Multiple array processors for ocean acoustic problems
[AD-A152174] N85-27641
UNDERWATER ENGINEERING
Underwater pipeline: Welding by high frequency induction
[BLL-WI-TRANS-682-(9312.57)] N85-27221
UNIFIED FIELD THEORY
Dark matter, galaxies, and large scale structure in the universe
[DE85-008053] N85-27786
UNITED STATES
Military journal on US intelligence satellites N85-26832
AWS (Air Weather Service) climatic briefs: North America
[AD-A152161] N85-27483
Great Lakes winter weather and ice conditions for 1982-83
[PB85-165009] N85-27498
UNIVERSE
Dark matter, galaxies, and large scale structure in the universe
[DE85-008053] N85-27786
UNMANNED SPACECRAFT
A study of spacecraft technology and design concepts, volume 1
[NASA-CR-172579-VOL-1] N85-26844
A study of spacecraft technology and design concepts. Volume 2: Appendices
[NASA-CR-172579-VOL-2] N85-26845
Soviet space programs, 1976-1980 (with supplementary data through 1983). Part 3: Unmanned space activities
[S-PRT-98-235-PT-3] N85-27765
UNSTEADY FLOW
Recent progress in computational aerodynamics N85-26626
LDA study of non-steady flame propagation in a constant volume duct
[DE85-007233] N85-26948
Experimental investigations of prismatic cylinders in flow with harmonic pulsations
[KU-SFB-210/E/4] N85-27166
UPPER ATMOSPHERE
Atmospheric density model N85-27297
Full shadow phenomenon in Earth's upper atmosphere N85-27316
UPPER IONOSPHERE
Determining effective rate of plasma heating in outer equatorial ionosphere using data from ISIS-1 and ISIS-2 satellites N85-26797
URANUS ATMOSPHERE
Possible period of Jovian activity and possibility of seasons N85-26810
Monodeurated methane in the outer solar system. 2. Its detection on Uranus at 1.6 microns
[NASA-CR-175762] N85-27782
URBAN DEVELOPMENT
Study of the urban evolution of Brasilia with the use of LANDSAT data
[E85-10101] N85-27321
URBAN PLANNING
Experience of the Institute of Space Research with the use of remote sensing in urban planning studies
[INPE-3159-PRE/533] N85-27770
URBAN TRANSPORTATION
Hybrid propulsion technologies for urban bus transit
[PB85-157469] N85-27773
USER MANUALS (COMPUTER PROGRAMS)
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 1: User's manual
[AD-A152268] N85-26725
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology
[AD-A151956] N85-27548
USER REQUIREMENTS
Study on needs for a magnetic suspension system operating with a transonic wind tunnel
[NASA-CR-3900] N85-26759
Design of computer-related workstations in relation to job functions and productivity
[AD-A151938] N85-27534
Management considerations for an information center
[AD-A151774] N85-27742
Personal computer aided decision analysis
[AD-A151911] N85-27743

V

VACCINES
Photovoltaic powered vaccine refrigerator-freezer systems field test results
[NASA-TM-86972] N85-27386
VACUUM DEPOSITION
Vacuum plasma coatings for turbine blades N85-26869
VACUUM EFFECTS
Mechanical properties of lunar materials under anhydrous, hard vacuum conditions: Applications of lunar glass structural components
[DE85-006682] N85-27271
VACUUM FURNACES
Studies on the processing methods for extraterrestrial materials
[NASA-CR-175778] N85-26768
VACUUM SYSTEMS
Measurement of NSLS distributed diode sputter ion pump characteristics
[DE85-06550] N85-27031
Management of vacuum leak-detection processes, standards and calibration
[DE85-006705] N85-27202
VALUE
Computing the singular value decomposition of a product of two matrices
[DE85-006977] N85-27631
VANES
Vortex shedding flowmeters for liquids at high flow velocities N85-26906
Aerodynamic forces developing in channels between vases in turbine drive wheels N85-27062
VAPOR DEPOSITION
Computer program for the calculation of multicomponent convective diffusion deposition rates from chemically frozen boundary layer theory
[NASA-CR-168329] N85-27164
VAPORIZING
Studies on the processing methods for extraterrestrial materials
[NASA-CR-175778] N85-26768
VAPORS
Development of a new faster process for the fabrication of ceramic fiber-reinforced ceramic composites by chemical vapor infiltration
[DE85-007550] N85-27007
VARIATIONS
Measuring electrical field fluctuations by Langmuir Double Probe Method N85-26789
VAX COMPUTERS
Scientific data bases on a VAX-11/780 running VMS
[DE85-007925] N85-27760
VECTOR ANALYSIS
Proposal for an extended set of FORTRAN Basic Linear Algebra subprograms
[DE85-007241] N85-27562
VECTOR SPACES
Schubert varieties are arithmetically Cohen-Macaulay N85-27592
The vector potential in a branched Riemann space
[VTH-LR-395] N85-27614
VECTORS (MATHEMATICS)
Recent trends in software technology for vector processors N85-26615
VEGA PROJECT
TASS update on flights of Vega-1 and Vega-2 N85-26803
Kovtunenko discuses Vega Project N85-26804
French and West German equipment for Vega Project N85-26805
VEGETATION
Use of Goudrian model in studying laws of reflection in vegetation-soil system in optical range. 2: Influence of illumination conditions on spectral brightness coefficients N85-26827
Microwave model prediction and verifications for vegetated terrain
[E85-10102] N85-27322
Function of remote sensing in Brazil
[INPE-3314-PRE/621] N85-27329
Impact of ozone on vegetation
[PB85-159937] N85-27403
VEGETATION GROWTH
Use of forest modeling to project acid rain effects
[DE85-005251] N85-27400
VELOCITY
Empirical development of ground acceleration, velocity and displacement for accidental explosions at J5 or the proposed large altitude rocket cell at Arnold Engineering Development Center
[DE85-008324] N85-27020
VELOCITY COUPLING
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
VELOCITY DISTRIBUTION
Study of the coupling between average, coherent and turbulent fields in a circular excited free jet
[ISL-R-115/83] N85-27184
Multinomial form of the solution of problems of the statistics of elastic rectangular disks
[REPT-17/1984] N85-27244
VENUS (PLANET)
TASS update on flights of Vega-1 and Vega-2 N85-26803
Kovtunenko discuses Vega Project N85-26804
French and West German equipment for Vega Project N85-26805
VENUS ATMOSPHERE
Mechanism of formation of low temperatures in nighttime Venusian thermosphere N85-26807
VERTICAL AIR CURRENTS
The study of thermal forecasting for gliding N85-27453
VERTICAL ORIENTATION
Scheme for atmospheric thermal sensing from satellites with enhanced vertical resolution N85-26823
The theoretical response of a vertical line array to wind-generated noise in shallow water
[AD-A151730] N85-27638
VERY HIGH FREQUENCIES
Generalized graph coloring: A frequency assignment method for VHF broadcasting
[TUM-M8405] N85-27535
VERY LARGE SCALE INTEGRATION
Techniques for computing the DFT using the residue Fermat number systems and VLSI N85-27097
An integrated UNIX-based CAD system for the design and testing of custom VLSI chips N85-27102
System design of automated VLSI (Very Large Scale Integrated) test station and implementation of selected system aspects
[AD-A151961] N85-27147
Radiation hardening for VLSI applications
[DE85-005493] N85-27155
VERY LONG BASE INTERFEROMETRY
Station coordinates and Earth rotation parameters from Lageos laser ranging N85-27299
Basic research for the geodynamics program
[NASA-CR-175751] N85-27424
VERY LOW FREQUENCIES
Hazards of VLF electromagnetic fields N85-27136

VIBRATION
Identification and control of structures in space [NASA-CR-175790] N85-26850
The effect of inaccuracies in structural models on the control of large space structures [AD-A151794] N85-26858
Flow dynamic environment data base development for the SSME N85-26885
Vibration characteristics of the HPOTP (High Pressure Oxygen Turbopump) of the SSME (Space Shuttle Main Engine) N85-26895
Flow-induced vibration of the SSME LOX posts: Additional issues [DE85-007339] N85-26916
Measurement of damping of graphite expoxy materials [NASA-CR-175793] N85-26925
Suppression of vibration effects on piezoelectric crystal resonators [AD-D011625] N85-27142
Quasi-steady vibrations of a rotating shaft grazing an obstacle: Spiral vibration [BLL-CE-TRANS-7962-(9022.09)] N85-27256
Quantum statistical theory of vibrational dynamics in a laser-driven admolecule-surface system [AD-A152022] N85-27719

VIBRATION DAMPING
Preliminary results on passive eddy current damper technology for SSME turbomachinery N85-26890

VIBRATION EFFECTS
Suppression of vibration effects on piezoelectric crystal resonators [AD-D011625] N85-27142
Dual species ion implantation of ternary compounds based on In-Ga-As [AD-D011617] N85-27698

VIBRATION ISOLATORS
Preliminary results on passive eddy current damper technology for SSME turbomachinery N85-26890
Consolidation theory with consideration of frame plasticity [REPT-9/1984] N85-27240

VIBRATION MEASUREMENT
Ultrafast holography using optical fibers [ISL-CO-238/83] N85-27204
Monitoring of turbo-machines by shaft vibration measurement [BLL-TRANS-7900-(9022.09)] N85-27255

VIBRATION MODE
Ultrafast holography using optical fibers [ISL-CO-238/83] N85-27204

VIBRATIONAL SPECTRA
A measurement of the vibrational band strength for the upsilon sub 3 band of the HO2 radical [NASA-CR-175858] N85-26936

VIDEO EQUIPMENT
Operation of autotracking system in various video playback modes N85-27055

VIDEO SIGNALS
Operation of autotracking system in various video playback modes N85-27055
Hardware test program for evaluation of baseline range-range rate sensor concept [NASA-CR-175794] N85-27193

VISCOELASTICITY
Dynamic response of shells and plates subjected to variable magnitude traveling loads N85-27250

VISCOPLASTICITY
Some advances in experimentation supporting development of viscoplastic constitutive models [NASA-CR-174855] N85-27260

VISCOSITY
Characterization-curing-property studies of HBRF 55A resin formulations [NASA-CR-175836] N85-26989

VISCOUS FLOW
A numerical procedure on three-dimensional parabolic flow in duct N85-26620
Computational aerodynamics in designing aircraft N85-26622
Recent progress in computational aerodynamics N85-26626
The role of computational fluid dynamics in aeronautical engineering N85-26629
Numerical analysis of flow non-uniformity in the hot gas manifold of the Space Shuttle main engine N85-26899

VISCOUS FLUIDS
Boundary layer at moving cylinder surface N85-27064

VISIBILITY
Air quality benefit analysis for Los Angeles and San Francisco based on housing values and visibility [PB85-168049] N85-27409
Spatial and temporal visual masking and visibility [AD-A151968] N85-27524
An evaluation of discretized conditional probability and linear regression threshold techniques in model output statistics forecasting of visibility over the north Atlantic Ocean [AD-A151955] N85-27619

VISUAL PERCEPTION
Spatial and temporal visual masking and visibility [AD-A151968] N85-27524

VOCODERS
Survey of narrow band vocoder technology [AD-A151919] N85-27114

VOICE CONTROL
A description of the process of elaborating man-machine dialog in an aircraft equipped with cathode tubes: Roles and specifications of piloted simulation methods N85-26658

VOIDS
Swelling behavior of titanium-modified AISI 316 alloys [DE85-007470] N85-26982

VOLCANOES
Evolution of stratospheric aerosol size distribution from ground-based radiometric measurements: A study of El Chichon aerosol [DE85-007555] N85-27439

VORTEX BREAKDOWN
La Recherche Aerospatiale Bimonthly Bulletin, Number 1984-4, 221/July-August [ESA-TT-884] N85-26637

VORTEX GENERATORS
An experimental investigation of two-dimensional flame-vortex interactions N85-26934

VORTEX SHEDDING
Vortex shedding flowmeters for liquids at high flow velocities N85-26906

VORTICES
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-2, 219/March-April [ESA-TT-878] N85-26635
Exploratory wind-tunnel investigation of a wingtip-mounted vortex turbine for vortex energy recovery [NASA-TP-2468] N85-26667
Development of a rotor wake-vortex model, volume 1 [NASA-CR-174849] N85-26668
An experimental investigation of two-dimensional flame-vortex interactions N85-26934
Vortex studies relating to boundary layer turbulence and noise [NASA-TM-87475] N85-27169

VORTICITY
The vector potential in a branched Riemann space [VTH-LR-395] N85-27614

W

WALL FLOW
An experimental investigation of the interaction between a shock wave and a turbulent boundary layer on a convex wall [VTH-LR-428] N85-27187

WAR GAMES
Automated CPX support system preliminary design phase [NASA-CR-175784] N85-27091

WARNING SYSTEMS
Preliminary airworthiness evaluation of a National Aeronautics and Space Administration automated stall warning system for an OV-1 aircraft [AD-A152010] N85-26706
Reusable rocket engine turbopump condition monitoring N85-26907
Information presentation in power plant control rooms [VTT-320] N85-27668

WATER POLLUTION
Acid rain: Effects on fish and wildlife [PB85-154672] N85-27402

WATER RESOURCES
Groundwater model for an island aquifer: Bribie Island groundwater study [CE-44] N85-27398

WATER VAPOR
Development of hydrogen resistant alloys N85-26873
An atlas of pure water vapor spectra from 500 to 5000/cm, Volume 2 [AD-A151757] N85-26940
Water vapor N85-27420
Precipitable water in the atmosphere, determined from surface dewpoint values N85-27457
Atmospheric frontal zone studies [NASA-CR-175293] N85-27469

WATER WAVES
Wave directional spectra via ARGOS N85-27343
Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance N85-27344
Atmospherically forced, coastally trapped, long period gravity waves off the south coast of southern Africa N85-27461

WAVE DISPERSION
A method of solving the dispersion equation for electrostatic electron waves in magnetized plasma [KGI-PREPRINT-071] N85-27697

WAVE EXCITATION
Study of the coupling between average, coherent and turbulent fields in a circular excited free jet [ISL-R-115/83] N85-27184

WAVE FUNCTIONS
Computer modeling of vibrational energy levels of potential laser candidates (diatomic molecules) [AD-A151765] N85-27209
Microscopic analysis of angular momentum projected HFB-states in terms of interacting bosons [DE85-007629] N85-27661

WAVE GENERATION
On gravitational waves N85-27026

WAVE PROPAGATION
Field near the front of a signal in a waveguide accomplished with dispersive plasma [REPT-11/1984] N85-27083
Characteristic functionals of stochastic wave processes [REPT-14/1984] N85-27084
Wave propagation in density stratified fluids N85-27162
Two-dimensional beat wave acceleration simulation [DE85-005961] N85-27214
Principles of wave formation along web of H-beams [BLL-M-36041-(5828.4)] N85-27253
Numerical resolution calculation for elastic-plastic impact problems [AD-A152292] N85-27270
Born inversion with a stratified reference velocity [AD-A149222] N85-27594
Research and development of subsurface acoustic wave devices for sensor applications [AD-A152197] N85-27642

WAVE REFLECTION
Results of simultaneous measurements of absorption and polarization of radio waves reflected from ionosphere N85-27313

WAVE SCATTERING
Field near the front of a signal in a waveguide accomplished with dispersive plasma [REPT-11/1984] N85-27083

WAVEGUIDES
Field near the front of a signal in a waveguide accomplished with dispersive plasma [REPT-11/1984] N85-27083

WAVELENGTHS
Population inversion in laser-initiated vacuum arcs [AD-A151958] N85-27210

WEAPON SYSTEMS
Design adequacy: An effectiveness factor N85-26642
Design-To-Cost (DTC) methodology to achieve affordable avionics N85-26645
Military journal on US intelligence satellites N85-26832

WEAR
Metal armatures for railguns [AD-A152129] N85-26838
Reusable rocket engine turbopump condition monitoring N85-26907
Effects of wear on structure-sensitive magnetic properties of ceramic ferrite in contact with magnetic tape [NASA-TM-87007] N85-26991
Effect of counterface material type and its topography on the tribological properties of polyimide composites [NASA-TM-87036] N85-26993
Breakway friction and dynamic friction/wear measurements of various ceramic materials from 25 C (75 F) to 650 C (1200 F) [NASA-CR-174803] N85-26994
Tooth wear in worm gears in vacuum N85-27070
Extreme evaluation of reliability indices for components of metallurgical equipment [BLL-M-36070-(5828.4)] N85-27234

WEAR INHIBITORS
Non-contact hydrostatic bearings N85-27046

WEATHER
The impact of weather on aviation safety [GPO-35-520] N85-26685
Regularities in recent changes in surface air temperature and atmospheric precipitaion fields N85-27311
Effect of precipitation on wind turbine performance [NASA-TM-86986] N85-27385
AWS (Air Weather Service) climatic briefs: Asia [AD-A151944] N85-27481

Comparison of circulation statistics based on FGGE (First GARP Global Experiment) level 3-B analyses produced by GFDL (Geophysics Fluid Dynamics Laboratory) and ECMWF (European Centre for Medium Range Weather Forecasts) for special observing periods
[PB85-153948] N85-27492
Monthly and seasonal weather outlook for mid-January to mid-February 1985, volume 39, number 2, January 15, 1985
[PB85-164572] N85-27500
Monthly and seasonal weather outlook for February 1985, volume 39, number 3, January 30, 1985
[PB85-159424] N85-27502

WEATHER DATA RECORDERS
Fog advection in the Namib N85-27454

WEATHER FORECASTING
Recent failures of weather satellites
[S-HRG-98-1070] N85-26855
Lightweight aerological radiosonde MARZ N85-27309
Symposium on Atmospheric Sciences in South Africa
[CSIR-S-331] N85-27442
The study of thermal forecasting for gliding N85-27453
Use of a network of telemetered meteorological stations for prediction of the distribution of an atmospheric tracer N85-27458
Forecast of Atlantic seasonal hurricane activity for 1985 N85-27470
A survey of major east coast snowstorms, 1960-1983. Part 2: Case studies of eighteen storms
[NASA-TM-86198] N85-27472
SINOGRAFO: A system for influencing and forecasting weather
[INPE-3349-PRE/628] N85-27475
Simulation of a synchronously coupled atmosphere-ocean prediction model
[AD-A152020] N85-27482
Hurricane Research Division, fiscal year 1984 programs, fiscal year 1985 projections N85-27491
SCPP (Sierra Cooperative Pilot Project) Forecasting Support N85-27493
Evaluation of the PROFS (Program for Regional Observing and Forecasting Services) 1982, real-time forecast experiment
[PB85-159747] N85-27495
Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones
[PB85-164994] N85-27499

WEATHER MODIFICATION
Ice multiplication in summertime cumulus clouds in the BEWMEX area N85-27445
Effects of cloud seeding on precipitation development in cumulus clouds N85-27456

WEATHER STATIONS
Fog advection in the Namib N85-27454
Use of a network of telemetered meteorological stations for prediction of the distribution of an atmospheric tracer N85-27458
Ground-based remote sensing of atmospheric pollution N85-27462
AWS (Air Weather Service) climatic briefs: North America
[AD-A152161] N85-27483
SCPP (Sierra Cooperative Pilot Project) data collection and analysis. Volume 1: Executive summary
[PB85-156065] N85-27494
Evaluation of the PROFS (Program for Regional Observing and Forecasting Services) 1982, real-time forecast experiment
[PB85-159747] N85-27495

WEBS (SUPPORTS)
Principles of wave formation along web of H-beams
[BLL-M-36041-(5828.4)] N85-27253

WEIGHT (MASS)
Some aspects of how to design cost-effective flight control systems N85-26639

WEIGHT REDUCTION
Filmwise condensation of steam on low integral-finned tubes
[AD-A152220] N85-27176

WEIGHTING FUNCTIONS
Locally-weighted-regression scatter-plot smoothing (LOWESS): A graphical exploratory data analysis technique
[AD-A152239] N85-27609

WEIGHTLESSNESS
USSR report: Space
[JPRS-USP-85-004] N85-26772
Free-surface phenomena under low- and zero-gravity conditions
[NASA-CR-175835] N85-27168

WELD STRENGTH
Paton Institute expert on GDR-USSR welding research N85-27078

WELD TESTS
Welder training/welder testing
[BLL-WI-TRANS-683-(9312.57)] N85-27223

WELDABILITY
Relationships between microstructure and microfissuring in alloy 718 N85-26876
Paton Institute expert on GDR-USSR welding research N85-27078

WELDED JOINTS
Evaluation of the corrosion properties of aluminum alloy 5083 weldments
[DE85-007729] N85-26977
Method of investigating accumulations of damage to weld joints in the case of low-cycle creep
[BLL-CE-TRANS-6088-(9022.09)] N85-27219
Special features of the one-sided automatic welding of structures of Al-Mg alloys N85-27222
Sources of improvement in quality of contact butt welding of wire
[BLL-M-36085-(5828.4)] N85-27225
An X-ray study of residual stresses in narrow groove TIG weldments
[DE85-006485] N85-27274

WELDED STRUCTURES
Institute's contribution to Soviet welding technology noted N85-27072

WELDING
Special features of the one-sided automatic welding of structures of Al-Mg alloys N85-27222
Hazards in welding due to oxygen changes in the workplace atmosphere
[BLL-WI-TRANSL-684-(9312.57)] N85-27224

WELDING MACHINES
Sources of improvement in quality of contact butt welding of wire
[BLL-M-36085-(5828.4)] N85-27225

WHALES
The ARGOS system used for tracking gray whales N85-27347

WHEAT
Modeling the backscattering and transmission properties of vegetation canopies
[E85-10099] N85-27320

WHISKER COMPOSITES
Particulate and whisker toughened alumina composites
[DE85-005239] N85-26930

WHITE LIGHT HOLOGRAPHY
The utilization of optical fibers in holography
[ISL-R-102/83] N85-27196

WILDLIFE
Acid rain: Effects on fish and wildlife
[PB85-154672] N85-27402

WILDLIFE RADIOLOCATION
Motivation for satellite tracking of southern elephant seals Mirounga leonina at sea N85-27346
The ARGOS system used for tracking gray whales N85-27347

WIND (METEOROLOGY)
Wind modelling for increased aircraft operational efficiency N85-26652
Use of a network of telemetered meteorological stations for prediction of the distribution of an atmospheric tracer N85-27458
A Markov method for simulating non-Gaussian wind speed time series
[DE85-007131] N85-27485

WIND EFFECTS
Dynamic and aeroelastic action of guy cables
[VTT-18] N85-27276
Response of a wind turbine blade to seismic and turbulent wind excitations N85-27375

WIND MEASUREMENT
Wind modelling for increased aircraft operational efficiency N85-26652
Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California
[NASA-CR-3901] N85-27463
Influence of coherent mesoscale structures on satellite-based Doppler lidar wind measurements
[NASA-CR-175853] N85-27467

WIND PRESSURE
The theoretical response of a vertical line array to wind-generated noise in shallow water
[AD-A151730] N85-27638

WIND PROFILES
Thermospheric winds observed by OI6300A Doppler shifts at 23 deg S in the Brazilian sector
[INPE-3384-RPE/470] N85-27479

WIND SHEAR
The use of pressure sensing taps on the aircraft wing as sensor for flight control systems N85-26660

WIND TUNNEL APPARATUS
Qualification of a wall gage for the SIMA wagon, adapted to the test of half models motorized by compressed air turbines — SIMA wind tunnel
[ONERA-PV-1/8088-GY] N85-26677
Study on needs for a magnetic suspension system operating with a transonic wind tunnel
[NASA-CR-3900] N85-26759
An automatic traversing system for Laser Doppler Anemometer (LDA) applications to wind tunnels and to free jets
[ISL-CO-225/83] N85-27490

WIND TUNNEL MODELS
Synthesis study: Validation of a gust generator in the presence of a model in a wind tunnel
[ONERA-RT-16/5108-RY-051] N85-26678

WIND TUNNEL TESTS
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-2, 219/March-April
[ESA-TT-878] N85-26635
Low Reynolds number vehicles
[AGARD-AG-288] N85-26666
Exploratory wind-tunnel investigation of a wingtip-mounted vortex turbine for vortex energy recovery
[NASA-TP-2468] N85-26667
An experimental and analytical study of the aerodynamic interference effects between two Sears-Haack bodies at Mach 2.7
[NASA-TM-85729] N85-26673
Measurements of the symmetric aerodynamic coefficients for flat faced cylinders in the angle of attack regime 0 to 90 deg for transonic and supersonic speeds
[FFA-TN-1984-04] N85-26675
Measurements in low pressure flow using an electronic beam detector — wind tunnel tests N85-26676
Synthesis study: Validation of a gust generator in the presence of a model in a wind tunnel
[ONERA-RT-16/5108-RY-051] N85-26678
Preliminary wind tunnel study of the influence of a jet on the unsteady aerodynamics of a turbojet engine
[ONERA-RT-12/5115-RY-230-R-231G] N85-26679
Wing buffeting active control testing on a transport aircraft configuration in a large sonic tunnel N85-26750
An experimental study of compressible turbulent reattaching free shear layers N85-27161

WIND TUNNEL WALLS
A curved test section for research on transonic shock wave-boundary layer interaction
[VTH-LR-414] N85-26682

WIND TURBINES
Response of a wind turbine blade to seismic and turbulent wind excitations N85-27375
Effect of precipitation on wind turbine performance
[NASA-TM-86986] N85-27385
Transient behavior of a single-blade horizontal-axis wind turbine
[MBB-UD-421/84-O] N85-27737

WIND VELOCITY
Comparison of wind velocity in thunderstorms determined from measurements by a ground-based Doppler radar and an F-106B airplane
[NASA-TM-86348] N85-26687
Formulation and implementation of nonstationary adaptive estimation algorithm with applications to air-data reconstruction
[NASA-TM-86727] N85-26699

WIND VELOCITY MEASUREMENT
The use of pressure sensing taps on the aircraft wing as sensor for flight control systems N85-26660
Conducting a wind sensing study
[NASA-CR-175782] N85-27465
Feasibility study on Laser Doppler Anemometer (LDA) wind velocity measurements using pulsed visible laser light
[ISL-CO-224/83] N85-27489

WINDPOWER UTILIZATION
Wind energy technology program summary
[DE85-007349] N85-27392
Transient behavior of a single-blade horizontal-axis wind turbine
[MBB-UD-421/84-O] N85-27737

WING TIPS
Exploratory wind-tunnel investigation of a wingtip-mounted vortex turbine for vortex energy recovery
[NASA-TP-2468] N85-26667

WINGS
Computational aerodynamics for aircraft wing design N85-26627
A numerical design method for three-dimensional transonic wings N85-26631
Hypersonic nonequilibrium gas flow past zero-aspect wing N85-27063

WIRE CLOTH
Flow around rotating and nonmoving circular cylinder near flat screen. Report 1: Aerodynamic forces in cylinder N85-27059
WORD PROCESSING
The Record of Electrical and Communication Engineering Conversazione, volume 53, no. 2, November 1984
[ISSN-0385-7719] N85-27022
The design of an English word-processor for scientific and technical use in which superscripts, subscripts and Greek characters are operated by screen-edit. 3 N85-27025
A procedure for communications with PDP-10 and PDP-11 (IS/1 UNIX) type computers through use of CPT word processing equipment, revision 1
[DE85-007596] N85-27540
WORKLOADS (PSYCHOPHYSIOLOGY)
A comparison of pictorial and speech warning messages in the modern cockpit
[AD-A151917] N85-26706
Aspects of application of ACT systems for pilot workload alleviation N85-26734
Statistical study of the dynamic analysis of the workload in the A310 certification campaign N85-27531
WRIST
Kinematic rate control of simulated robot hand at or near wrist singularity
[NASA-TP-2440] N85-27575

X

X RAY ANALYSIS
La Recherche Aerospatiale Bimonthly Bulletin Number 1984-3, 220/May-June
[ESA-TT-882] N85-26696
Elemental analysis of aerosols in Transvaal urban and power-producing areas using time and size-resolved samples N85-27443
Atom location by electron channeling analysis
[DE85-007549] N85-27716
X RAY ASTRONOMY
Analysis of short-period changes in intensity of hard X-radiation of solar flares registered aboard Venera-13 and Venera-14 spacecraft N85-26806
Optical pulsar in the Large Magellanic Cloud remnant 0540-69.3
[DE85-006707] N85-27788
The soft X-ray background as a supernova blast wave viewed from inside: Solar abundance models
[NASA-CR-175767] N85-27813
X RAY DIFFRACTION
Ca-Ga, Sr-Ga and Ba-Ga binary systems
[DE85-006454] N85-26960
X RAY LASERS
Population inversion in laser-initiated vacuum arcs
[AD-A151958] N85-27210
X RAYS
An X-ray study of residual stresses in narrow groove TIG weldments
[DE85-006485] N85-27274
Software for reflectivity calculations of X-ray mirrors, revision 1
[DE85-006642] N85-27688
A synchrotron/inverse Compton interpretation of a solar burst producing fast pulses at lambda 3 mm and hard X-rays N85-27815

Y

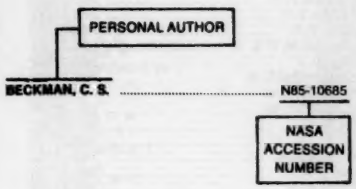
YAG LASERS
Conducting a wind sensing study
[NASA-CR-175782] N85-27465
Feasibility study on Laser Doppler Anemometer (LDA) wind velocity measurements using pulsed visible laser light
[ISL-CO-224/83] N85-27489
YEAST
Microbial ecology of extreme environments: Antarctic yeasts and growth in substrate-limited habitats
[NASA-CR-175810] N85-27509
YIELD POINT
Magnetic method of inspecting mechanical properties of general purpose tubes
[BLL-M-36084-(5828.4)] N85-27235
YIELD STRENGTH
Magnetic method of inspecting mechanical properties of general purpose tubes
[BLL-M-36084-(5828.4)] N85-27235

Z

ZENITH
Simultaneous Earth observations from 2 satellites
[NASA-TM-86204] N85-27325
ZEOLITES
Experimental testing of cooling by low pressure adsorption in a zeolite
[DE85-007509] N85-26763
ZINC
Characteristics of polyacrylic acid-complexed zinc phosphate conversion films deposited on metal surfaces
[DE85-004057] N85-26974
ZIRCONIUM OXIDES
Rocket thrust chamber thermal barrier coatings N85-26867
ZODIACAL DUST
Zodiacal light: A replica of the interplanetary dust cloud — Helios space probe N85-27796
ZODIACAL LIGHT
Zodiacal light: A replica of the interplanetary dust cloud — Helios space probe N85-27796

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

ABBE, D. N85-26932
ABDU, M. A. N85-27433
N85-27434
ABE, Y. N85-27680
ABRAHAM, Z. N85-27777
N85-27778
ABRAMENOK, G. A. N85-26828
ABUJELALA, M. T. N85-26716
ADABO, G. J. N85-26856
ADAMS, R. E. N85-26955
ADELMAN, J. L. N85-27169
ADERHOLD, D. J. N85-26895
ADLER, R. S. N85-26706
AGAFONOV, M. S. N85-26818
AGRELL, N. N85-26674
AHN, T. M. N85-26976
AIKEN, E. W. N85-26720
AIU, W. K. N85-27111
AL-KINANI, G. N85-27092
ALBE, E. N85-27204
ALBE, F. N85-27196
ALESSI, J. G. N85-27693
ALIEV, G. M. N85-27235
ALLEGRE, J. N85-26576
ALLEN, C. T. N85-27320
ALLEN, G. R. N85-27200
ALLEN, P. B. N85-27166
ALTER, W. S. N85-26875
ALTMAN, D. E. N85-27087
ALVES, F. P. N85-27477
AMANO, T. N85-27676
AMIRO, I. Y. N85-27068
AMOIA, V. N85-26643
AMURSKIY, G. I. N85-26828
AMDER, M. E. N85-27793
ANDERSON, B. P. N85-26896
ANDERSON, C. M. N85-26855
ANDERSON, D. C. N85-26735
ANDERSON, J. G. N85-27414
N85-27415
N85-27416
N85-27419
N85-27421
ANDERSON, J. L. N85-27789
ANDERSON, P. G. N85-26899
ANDERSON, R. R. N85-27801
ANDRADE-FILHO, J. P. N85-26856
ANDREWS, R. W. N85-27370
ANDREYEV, A. V. N85-26814
ANNEGARN, H. J. N85-27443
ANTSIFEROVA, N. G. N85-26812
APPEL, J. N85-26690
APPLETON, B. R. N85-26963
N85-27715
ARENY, A. N85-26836
ARIMOTO, H. N85-27677
ARIPOV, K. K. N85-27036
ARIKHIPENKO, N. A. N85-27040
ARMOLD, A. T. N85-27546
ARMSTRONG, L. E. N85-27521
ARNOLD, P. B. N85-26722
ARVIDSON, R. E. N85-27324
ASHURI, K. N85-27067
ASKINAS, A. A. N85-27148
ASSEL, R. A. N85-27496
AUBRY, Y. N85-27217
N85-27717
AUDUNSON, T. N85-27344
AUERBACH, J. M. N85-27688
AUSTERN, B. M. N85-27541
AUVIL, J. D. N85-27742
AVASTE, O. A. N85-26821
AVDEEV, V. P. N85-27573
AVDUYEVSKIY, V. S. N85-26831
AVELLA, A. J., JR. N85-27012
AZUMI, M. N85-27676

B

BABICH, I. Y. N85-27065
BAES, C. F., III N85-27401
BAIRD, H. D., JR. N85-26693
BAJKOWSKI, J. N85-27245
BAKKER, P. G. N85-26680
N85-27282
BAKOR, Y. N85-27776
BALABANOV, I. V. N85-27050
BALKOVA, I. N85-27078
BALLATO, A. D. N85-27143
N85-27145
BANDERET, L. E. N85-27525
BANNINK, W. J. N85-26682
N85-26683
BANTLE, J. W. N85-26673
BARAT, C. N85-26806
BARBER, J. P. N85-26915
BARBINI, I. S. N85-27221
BARILLOT, M. N85-27217
BARKER, K. N85-27575
BARKHOUDARIAN, S. N85-26907
N85-26908
BARNES, C. W. N85-27682
BARNES, L. M. N85-27029
BARR, S. M. N85-27767
BARRETT, D. L. N85-27709
BARRETT, R. J. N85-27606
BARROS, C. J. C. N85-26856
BARROW, C. H. N85-27790
BARSTOW, S. F. N85-27344
BARTHELEMY, J. F. M. N85-27257
BARYSHNIKOV, A. Y. N85-27076
BASU, S. N85-27423
BATES, J. B. N85-27005
BATISTA, I. S. N85-27433
N85-27434
BATISTA, P. P. N85-27435
BATTAT, M. E. N85-27692
BAUER, F. N85-27008
BAUKE, W. N85-27664
BAUMANN, W. T. N85-27469
BAVASSANO, B. N85-27800
BEARDMORE, G. N85-26848
BEATTY, R. F. N85-26892
N85-26896
BEATY, D. N85-27347
BECHER, P. F. N85-26930
BECKWITH, S. N85-27783
BECLE, J. P. N85-26877
BECQ, D. N85-27343
BEDFORD, P. A. N85-27337
BEEN, L. K. N85-27617
BELCHER, R. C. N85-26769
BEN-REUVEN, M. N85-26942
BENKOVITZ, C. M. N85-27760
BENOIT, A. N85-26851
BENTS, D. J. N85-26912
BERENBCHOT, G. H. N85-26881
BEREZHKO, V. G. N85-26801
BERGE, G. L. N85-27096
BERGLUND, H. N85-26575
BERKELAAR, J. W. G. A. N85-26985
BERMAN, E. N85-27512
BERNHARDT, J. H. N85-27135
BEST, R. N85-27030
BESTER, M. N. N85-27346
BESUNER, P. M. N85-26663
BETBEDER, M. N85-27217
BETSIS, D. N85-27586
BEURNIER, D. N85-26753
BEZRODNYKH, I. P. N85-26801
BEZRUKOV, V. I. N85-26957
BHAT, B. N. N85-26882
BHUSHAN, C. N85-27092
BIERMANN, W. N85-27030
BIGELOW, T. S. N85-27469
BILGRAM, R. N85-27726
BILL, R. C. N85-26964
BILLIG, V. N85-27810
BINGHAM, C. R. N85-27652
BIRD, M. K. N85-27805
BIRKENHEURE, D. N85-27495
BIRYULINA, M. S. N85-26822
BITTENCOURT, G. N85-27544
BLACIC, J. D. N85-27271
BLACK, J. D. N85-27226
BLACKMAN, C. F. N85-27527
BOBIN, L. N85-27185
BODECHTEL, J. N85-27732
BOEER, K. N85-27713
BOEHM, M. N85-27444
BOES, D. J. N85-26994
BOGOVALOV, S. V. N85-26806
BOHDANSKY, J. N85-27662
BOHRET, H. N85-26744
BOOTH, D. N85-27340
BORDEAUX, T. A. N85-27091
BORN, G. H. N85-27295
BORUTZKI, S. E. N85-27106
BOSTICK, E. E. N85-26987
BOTTCHER, C. N85-27658
N85-27711
BOTZLER, L. N85-26839
N85-27729
BOULAY, J. L. N85-26690
BOULWARE, D. G. N85-27635
BOWYER, J. N85-27092
BOYARSKI, D. P. N85-26860
BOYD, B. D. N85-27606
BRADLEY, R. S. N85-27496
BRAGER, H. R. N85-26982
BRAGINA, M. P. N85-26812
BRAHMANANDARAO, V. N85-27476
BRAHMER-KACPRZYNSKA, A. N85-27083
BRANDL, D. N85-27422
BRANETS, V. N. N85-26781
BRANNIGAN, M. N85-27587
BRANSFORD, J. W. N85-26874
BRATOLYUBOVA-TSULUKIDZE, L. S. N85-26800
BRAULT, J. N85-27782
BRAUNLICH, P. F. N85-27212
BREGER, D. S. N85-27396
BREKKE, S. N85-27639
BRIKMANIS, C. K. N85-27227
BRINTZENHOFF, A. L. N85-27559
N85-27560
N85-27561
BRISTOL, R. I. N85-27376
BROTTE, C. N85-26678
BROUTET, F. N85-26690
BROWN, A. N85-26647
BROWN, L. N85-27530
BROWN, R. J. N85-27518
BROWN, T. G. N85-26696
BRUINTJES, R. T. N85-27445
BRUMLEVE, T. D. N85-27379
BRUNDRIT, G. B. N85-27448
BRUNE, W. H. N85-27416
BRUNKE, E. G. N85-27447
BRUNNER, D. N85-26660
BRUZZONE, G. N85-26690
BUCKINGHAM, S. L. N85-26737
BUCKLES, B. P. N85-27543
BUCKLEY, D. H. N85-26991
BUDILOVSKI, V. A. N85-27225
BUECHER, U. N85-27358

BUKLEY, A. P. N85-26889
BUNTING, R. F. N85-27495
BURATI, J. L. N85-26761
BURFORD, L. A. N85-26955
BURG, K. V. N85-26946
BURGER, A. P. N85-27448
BURGER, L. W. N85-27449
BURKE, P. R. N85-26913
BURLAGA, L. N85-27800
BURRAGE, R. G. N85-26751
BURTON, R. A. N85-26743
BUSH, I. J. N85-27191
BUT, D. A. N85-27048
BUTLER, P. B. N85-27010
BUTLER, R. W. N85-26759
N85-27616
BUTNER, M. F. N85-26880
BUTTER, U. N85-26639
N85-27729
BYCHKOV, N. M. N85-27059
BYER, R. L. N85-27465
BYKOV, L. N. N85-27157

C

CAIRNIE, A. N85-27342
CALLISON, R. D. N85-27342
CAMILLI, P. P. G. N85-27194
N85-27195
CAMPBELL, J. K. N85-27095
CAMPBELL, R. B. N85-27382
CANTARANO, S. N85-27800
CAPPEL, K. L. N85-26893
CAPPIELLO, C. N85-27692
CAPUTO, A. J. N85-27007
CAPUTO, M. N85-27425
CARADONNA, F. X. N85-26669
CARCIELLO, N. N85-26974
CARPENTER, H. W. N85-26868
CARRAN, K. L. N85-27126
CARROLL, R. J. N85-27602
CARRUTHERS, T. F. N85-27141
CARSON, C. C. N85-27393
CARSON, E. T. N85-27091
CARTER, H. N85-27512
CARZOO, S. W. N85-27575
CASPI, S. N85-27564
CATT, R. N85-26656
CATTROLL, S. W. N85-27522
CAULFIELD, H. J. N85-27198
CHAFFEE, A. D. N85-27692
CHAGAS, J. C. S. N85-27428
N85-27429
CHAIX, P. N85-26650
CHALLITA, A. N85-26915
CHAMIS, C. C. N85-26887
CHAN, F. P. N85-27103
CHAN, T. F. N85-27556
CHANDLER, W. T. N85-26872
CHANG, D. S. N85-27110
CHANG, J. J. N85-27097
CHANT, V. G. N85-27396
CHAPMAN, G. T. N85-27167
CHASON, M. K. N85-27710
CHATBURN, C. C. N85-27106
CHAUVILLE, J. N85-27782
CHEN, B. K. N85-27164
CHEN, C. H. N85-27748
CHEN, C. K. N85-27662
CHEN, H. H. N85-27749
CHEN, K. J. N85-26922
CHEN, S. S. N85-26916
CHENG, R. K. N85-26948
CHERNOV, A. A. N85-26783
CHERTOK, M. B. N85-26781
CHESTERS, D. N85-27427
CHEUNG, K. P. N85-26946
CHIAPPETTA, L. M. N85-27584
CHIBA, J. N85-27026
CHILDRESS, C. T., JR. N85-27569
N85-27570
CHILDS, D. W. N85-26895
CHIN, J. N85-26736
CHIN, R. C. Y. N85-27563
CHINN, D. N85-27291
CHISHOLM, J. P. N85-26721
CHO, K. N85-27267
CHOPLIN, J. N85-26753
CHOUDHURY, A. K. M. M. N85-27698
CHRIEN, R. E. N85-27659
CHRINER, E. K. N85-26972
CHRISTENSEN, S. W. N85-27559
N85-27560
N85-27561
CHRISTODOULIDIS, D. N85-27291
CHUDNOVSKY, A. N85-27272
CIMINO, M. B. N85-27389
CLARK, B. A. N85-27611
CLARK, D. N85-27664
CLARK, S. K. N85-26701
CLARY, G. R. N85-26721
CLEMENT, S. N85-27238
CLEMENTS, D. A. N85-27016
CLEMENTS, P. A. N85-27105
CLEMESHA, B. R. N85-27479
CLIFF, W. C. N85-27463
CLIFFORD, T. E. N85-27229
CLINARD, F. W., JR. N85-27789
COCKS, F. H. N85-27003
CODY, J. C. N85-26879
COFFEE, T. P. N85-26944
COFFEY, H. E. N85-27819
N85-27820
COFFIN, T. N85-26884
COHEN, J. K. N85-27594
COLAN, H. N85-27081
COLES, D. N85-27168
COLLAR, P. G. N85-27345
COLLINS, G. N85-27651
COLLINS, T. L. N85-27655
COLOMBO, O. L. N85-27288
N85-27293
N85-27294
COMBI, M. R. N85-27781
CONDER, L. N85-27197
CONDRON, T. J. N85-26998
COOKE, J. F. N85-26973
COOPER, D. E. N85-26927
COPELAND, B. J. N85-27404
COPELAND, R. J. N85-27394
COPENHAVER, C. N85-27692
CORK, C. P. N85-27203
CORONATO, P. A. N85-26913
CORREIA, E. N85-27815
CORRIGAN, R. D. N85-27385
CORSETTI, C. D. N85-27597
COSTA, J. E. R. N85-27815
COSTA, R. D. N85-26856
COTE, P. J. N85-27150
COTTER, S. J. N85-27399
COY, J. J. N85-27227
N85-27228
CRACKNELL, A. P. N85-27342
CRANDALL, D. H. N85-27658
CRAVEN, C. A. N85-26971
CREIGHTON, B. M. N85-27270
CRIM, F. F. N85-27650
CROCKER, M. J. N85-26925
CROOKER, N. U. N85-27426
CRUMLEY, R. L. N85-27772
CULLEN, D. E. N85-27642
CUNNINGHAM, A. R. N85-27012
CUNNINGHAM, R. E. N85-26890
CURRY, R. E. N85-27528

D

DACUNHA, R. P. N85-27093
N85-27194
DACUNHALIMA, I. C. N85-27702
N85-27704
DAFT, R. L. N85-27746
DAHL, H. J. N85-27731
DAIGUJI, H. N85-26617
DAILLET, S. N85-26843
DAKHOUL, Y. M. N85-27705
DALE, V. H. N85-27400
DALEY, E. N85-26740
DAMON, E. K. N85-26940
N85-27089
DANCER, A. N85-27644
DASILVEIRAMASCARENHAS, A., JR. N85-27477
DAVID, J. W. N85-27218
DAVIDSON, J. W. N85-27692
DAVIE, N. T. N85-27181
DAVIS, B. C. N85-27020
DAVIS, J. H. N85-26882
DAVIS, L. B. N85-26896
DAVIS, T. J. N85-26721
DAVIS, W. J. N85-26745
DAWSON, J. M. N85-27214
DAYA, M. B. N85-27595
DEALMEIDFERREIRA, A. C. N85-27675
DEASSUNCAO, G. V. N85-27545
DEBARROSAGUIRRE, J. L. N85-27318
DEBENTZMANN, F. N85-27238
DEBERGH, C. N85-27782
DEBRITO, J. I. B. N85-27476
DEFONTAINE, D. N85-26979
N85-26981
DEHMEL, G. N85-27799
DEHOFF, B. S. N85-26914
DEISZ, M. A. N85-26987
DEJAGER, J. M. N85-27450
DEJONG, H. F. N85-26985
N85-26986
N85-27009
DEKONING, C. A. M. N85-27280
DELAHAY, P. N85-26946
DEMATOS, J. D. N85-27195
DEMESQUITA, A. R. N85-27477
DEMIGLIO, R. D. N85-27385
DEMIKOV, K. Y. N85-27058
DEMIRANDA, F. P. N85-27326
DEMORAIS, T. K. N85-27545
DENADAI, F. C. N85-26856
DEOLIVEIRA, M. D. L. N. N85-27321
DEREGO, P. J. N85-27526
DERENNAESOUZA, C. N85-27330
DERIGLAZOV, L. V. N85-27065
DESALABERRY, B. N85-26649
DESCH, M. D. N85-27790
DESER, S. N85-27635
DESTUYNDER, R. N85-26750
DEULIN, Y. A. N85-27070
DEUTSCH, L. J. N85-27102
DEVYNCK, D. N85-26941
DEZHUROV, R. K. N85-27044
DIAS, L. A. V. N85-27319
N85-27330
N85-27544
DIAZ, H. F. N85-27486
DIDOMENICO, E. D. N85-26702
DIEL, H. A. N85-27557
DIGOEV, A. K. N85-27156
DIKOVSKAYA, N. D. N85-27059
DILLON, J. J. N85-26977
DILLON, O. W., JR. N85-27259
DIUNIZIO, M. N85-27619
DIXON, K. R. N85-27117
DIXON, M. J. N85-27451
DODDS, J. G. N85-26841
DODGE, R. C. N85-26701
DOLIDZE, V. S. N85-26806
DOLMATOV, V. N85-26775
DOMAGALA, P. N85-27082
DOMINIC, R. J. N85-26886
DONGARRA, J. J. N85-27562
N85-27565
DOREMUS, R. H. N85-27004
DREMLYUGA, A. I. N85-27222
DRESHFIELD, R. L. N85-26866
N85-26870
DRESSE, B. N85-27359
DRESSENDORFER, P. V. N85-27155
DREUMEL, W. H. M. N85-27280
DROWLEY, R. D. N85-27623
DUBAY, C. L. N85-27707
DUCROZ, J. N85-27562
DUDNEY, N. J. N85-27005
DUENAS, C. R. E. R. N85-26856
DUNAND, F. N85-26690
DUNHAM, R. E., JR. N85-26687
DUNN-RANKIN, D. N85-26948
DUNN, G. H. N85-27658
DURNEY, C. H. N85-27129
DUSSOULIER, A. N85-26718
DUTKIEWICZ, R. K. N85-27452
DYCHES, G. M. N85-27231
DYER, R. N85-26665
DZIEDZIC, A. N85-26946

E

EASTMAN, L. F. N85-27706
ECKSTEIN, W. N85-27662
EDENHOFER, P. N85-27804
EDGAR, R. J. N85-27813
EDGAR, R. M. N85-27006
EDINGER, J. G. N85-27407
EDWARDS, M. N85-27453
EGGER, H. N85-27670
EIDENSCHINK, R. N85-27718
ELAM, S. L. N85-27566
ELDRIDGE, G. W. N85-27709
ELISHAKOFF, I. N85-27615
ELISHAKOFF, O. N85-27622
ELLETT, D. J. N85-27342
ELLIS, J. R. N85-27260
ELZOGHBI, G. B. N85-26761
EMMITT, G. D. N85-27467
ENDO, H. N85-26613
ERRETT, E. B. N85-27155
ESPOSITO, P. B. N85-27095
ESTES, R. N85-27291

ESTIE, K. E. N85-27454
ETHERIDGE, J. T. N85-27745
ETKIN, B. N85-27441
EVANS, M. R. N85-26756
EVRARD, D. N85-26644

F

FABBRI, M. N85-27628
N85-27700
N85-27701
FAIFER, S. I. N85-27156
N85-27157
FAIRFAX, S. A. N85-27690
FARIA, L. J. N85-26856
FARLEY, G. L. N85-26924
FARMER, R. C. N85-27705
FARTYSHEV, V. N85-26774
FEATHERSTON, C. D. N85-27012
FEBER, R. C., JR. N85-27789
FECHTIG, H. N85-27797
FEINBERG, D. A. N85-27018
FEKLISTOV, S. I. N85-27219
FELSENTREGER, T. L. N85-27290
FENG, D. H. N85-27660
FERRANTE, M. C. N85-27113
FERREIRADASILVA, A. N85-27699
N85-27700
N85-27702
FERRENTINO, G. L. N85-26838
FERZINGER, J. H. N85-27170
FICKLIN, R. N85-26996
FILLER, R. L. N85-27144
N85-27146
FISCHER, G. N85-27507
FISCHER, R. N85-27714
FISHER, K. D. N85-27517
FISHER, S. C. N85-26911
FLECHNER, S. G. N85-26667
FLECK, J. N. N85-26881
FLECK, T. N85-27730
FLEETER, S. N85-26670
FLEETWOOD, D. M. N85-27155
FLEISCHER, S. L. M. N85-27455
FOERSTER, C. L. N85-27031
FONG, Z. S. N85-27206
FONSTAD, C. G. N85-27698
FONTAINE, G. N85-27775
FORESTER, D. W. N85-27011
FORESTI, C. N85-27321
FORMAGGIO, A. R. N85-27545
FORSLUND, D. W. N85-27214
N85-27683
FORSYTH, E. B., SR. N85-27153
FORTNA, H. C. N85-26707
FOSTER, W. A., JR. N85-27284
FOUQUART, Y. N85-27487
FRANCISCO, A., JR. N85-26856
FRANKE, R. N85-27644
FRANKE, S. J. N85-27317
FREDERICK, F. A. N85-27523
FREITAG, R. F. N85-26846
FRIDLYAND, G. V. N85-27055
FRIDLYAND, L. V. N85-27055
FRIEDLANDER, H. N. N85-27792
FROMZEL, V. A. N85-27053
FROST, H. M. N85-27789
FRYXELL, R. E. N85-26711
FUKUDA, M. N85-26619
FUNDERLIC, R. B. N85-27621
FUNG, A. K. N85-27322
FUSARO, R. L. N85-26993

G

GABRIEL, H. W. N85-27372
GABRIEL, N. J. S. N85-27698
GADZHIYEV, R. M. N85-27312
GAHN, R. F. N85-27387
GAIER, J. R. N85-26992
GALAMBOS, J. D. N85-27695
GALLAGHER, D. L. N85-27567
GARCIA, P. R. M. N85-27349
GARNER, F. A. N85-26982
GARVER, W. R. N85-27027
GASCARD, J. C. N85-27339
GAUGETT, R. N85-26657
GAVRILOV, N. N85-26832
GAYNER, C. A. N85-27572
GAZEAUD, G. N85-27032
GEAR, J. A. N85-27162
GEARING, G. M. N85-27389
GEARY, J. M. N85-27189
GEE, G. W. N85-27643
GEE, S. W. N85-27197
GEHRKE, P. N85-27735
GELBARD, E. M. N85-27663
GELLER, M. N85-27087
GENT, A. N. N85-26999
N85-27267
GEORGE, T. F. N85-27719
GEORGIADIS, I. V. N85-27176
GERLA, M. N85-27669
GERMAN, I. M. N85-27253
GERMAN, R. M. N85-27004
GERRISH, P. F. N85-27006
GILSON, R. L. N85-26634
GILTINAN, D. M. N85-27602
GINSBURG, Y. A. N85-26788
GIORDANO, J. C. N85-26891
GIRARDEAU, M. D. N85-27648
GLADKOV, F. A. N85-27042
GLAESE, J. R. N85-26889
GLATMAN, L. I. N85-26812
GLAZNEV, V. N. N85-27060
GLIEBE, P. R. N85-26668
GLOERUD, H. N85-26662
GLOT, J. P. N85-27350
GLOVER, T. A. N85-27275
GLOWER, L. N85-26929
GLUKHOV, G. A. N85-26802
GMELIN, B. N85-26734
GOEKOGLU, S. A. N85-27164
GOESSMANN, M. N85-27360
GOLD, T. N85-27373
GOLDBERG, B. A. N85-27468
GOLDSTEIN, D. M. N85-26966
GOLDSTEIN, M. L. N85-27784
GOLIKOV, I. A. N85-27316
GOLUBINSKIY, A. I. N85-27063
GOLUBKIN, V. N. N85-27063
GONZALEZ, W. D. N85-27432
N85-27437
GOODESS, C. M. N85-27486
GOODWIN, F. R. N85-27624
GORCHAKOV, Y. V. N85-26791
GORDIYETS, B. G. N85-26807
GORGOL, J. F. N85-27012
GORKER, G. E. N85-27696
GOROZHANKINA, S. M. N85-26826
GORSHKOVA, I. I. N85-26827
GOSMAN, A. D. N85-27584
GOTSULYAK, Y. A. N85-27067
GOUDON, J. C. N85-26650
GOUGH N85-27464
GRAEBER, U. P. N85-26746
GRAF, A. J. N85-27012
GRAHAM, R. B. N85-27133
N85-27138
GRANDT, A. F., JR. N85-27265
GRAVELLE, A. N85-26679
GRAVES, R. I. N85-26917
GRAY, W. M. N85-27470
GREEN, J. L. N85-27567
GREENBAUM, S. G. N85-27001
GREGORY, D. C. N85-27658
GREINER, W. N85-27361
GRIFFIN, D. C. N85-27658
N85-27711
GRIGORENKO, Y. M. N85-27067
GRIGOREV, A. A. N85-26958
GRIMLEY, R. T. N85-26768
GROOTERS, F. N85-27352
GROPP, W. D. N85-27571
GROVE, J. W. N85-26945
GRUDKOWSKI, T. W. N85-27642
GRUEN, E. N85-27797
GUENZER, C. S. N85-27192
GUIDRY, M. W. N85-27652
N85-27660
GUIMARAES, P. S. N85-27702
GULYAYEV, V. I. N85-27067
GUNDERSON, R. N85-27773
GUNZBURGER, M. D. N85-27178
GUOGUANG, Y. N85-27305
GURNETT, D. A. N85-27801
GUSTAFSON, S. A. N85-27585
N85-27587
GUTNIK, S. A. N85-26777
GUY, A. W. N85-27130
N85-27136
GUZ, A. N. N85-27065

H

HAAS, J. E. N85-26900
HABAYEB, A. R. N85-26642
HADLEY, D. L. N85-27438
HAEBERLEIN, R. N85-27362
HAERTIG, J. N85-27184
N85-27646
HAGEDORN, N. H. N85-27387
HAGEMAN, R. N85-27409
HAGENSON, R. L. N85-27692
HAGER, B. H. N85-27588
HALICIOGLU, T. N85-27262
HALL, M. R. N85-27390
HALLAUER, W. L., JR. N85-27257
HAMADA, Y. N85-27676
HAMAMOTO, A. N85-26926
HAMLIN, D. J. N85-26841
HAMMARLING, S. N85-27562
N85-27565
HAMPEL, V. E. N85-27572
HAMPSON, M. E. N85-26907
HAMSON, R. M. N85-27638
HAN, L. S. N85-26929
HANDLER, G. S. N85-27744
HANKINS, J. D. N85-26896
HANSEN, R. S. N85-26743
HANSON, R. J. N85-27562
HAPPE, J. A. N85-26952
HARDIN, J. C. N85-27169
HARF, F. H. N85-26963
HARLING, O. K. N85-26971
HARMAN, J. M. N85-27159
HARRIES, W. L. N85-27206
HARRIS, D. B. N85-27215
HARRIS, D. O. N85-26863
HARRIS, J. M. N85-27496
HARRIS, P. N85-27656
HARTE, J. R. N85-27158
HARTEN, A. N85-27589
HASHIMOTO, A. N85-27515
HAUFLER, G. N85-27220
HAUGEN, D. A. N85-27495
HAWLEY, J. F. N85-27780
HAYDEN, R. F. N85-27643
HAYDN, R. N85-27732
HAYES, R. N85-26849
HAYS, D. A. N85-27096
HAZELTINE, R. D. N85-27694
HAZEN, N. L. N85-27415
HEARN, D. B. N85-27599
HEATH, M. T. N85-27631
HEATWOLE, D. N85-27405
HECKMAN, G. R. N85-27818
HEDGEPETH, J. M. N85-26848
HEDSTROM, G. W. N85-27563
HEFLIN, W. L. N85-27741
HEGEMANN, B. E. N85-27572
HEIFETZ, D. N85-27695
HELIE, P. N85-26858
HELLER, P. R. N85-27643
HELM, M. N85-27564
HEMMER, G. L. N85-27493
HEMMERLE, G. N85-27744
HENAGER, C. H., JR. N85-26975
HENDERSON, B. J. N85-27550
HENDERSON, T. N85-27714
HENDRICKS, R. C. N85-27165
HENNE, M. N85-26855
HEPBURN, C. D. N85-27091
HERBETTE, G. N85-27233
HERNQUIST, L. E. N85-27774
HERO, A. O. N85-27607
HERSHKOWITZ, J. N85-27028
HERVIG, L. K. N85-27529
HESS, A. N85-27236
HESS, F. R. N85-27505
HESSLING, U. N85-27533
HETTMANSPERGER, T. P. N85-27553
HIENDLMEIER, G. N85-27811
HILL N85-27464
HILLSTROM, W. W. N85-27014
HINCHLIFFE, I. N85-27634
HINE, M. J. N85-26892
HINRICHSEN, R. L. N85-27252
N85-27266
HIROSE, H. N85-26628
HIRSCHEL, E. H. N85-27725
HISKES, J. R. N85-27657
HISLOP, A. R. N85-27139
HOBSON, J. J. N85-27618
HODGES, D. H. N85-27258
HODGES, W. T. N85-26996
HODSON, R. G. N85-27404
HOFFMAN, F. E. N85-26842
HOFMANN, O. N85-27734
HOGAN, T. A. N85-26996
HOGER, A. G. N85-27248
HOISINGTON, C. N85-27347
HOLBERG, J. B. N85-27775
HOLBERT, R. K., JR. N85-26977
HOLDRIDGE, R. D. N85-26723

HOLMES, J. K. N85-26841
HOLMES, J. T. N85-27006
HOLMES, R. R. N85-26869
HOLNICKI-SZULC, J. N85-27243
HOLT, R. J. N85-27853
HOLTON, J. R. N85-27413
HONG, R. C. Y. N85-27375
HOOPER, R. J. N85-27896
HOPKINS, D. A. N85-26887
HORNBY, P. N85-27627
HORNER, R. M. N85-26741
HOROWITZ, E. N85-26961
HOUCK, J. A. N85-27575
HOWALD, A. M. N85-27658
HOWES, F. A. N85-27563
HOYNIAK, D. N85-26670
HSU, I. S. N85-27097
HUA, C. T. N85-27247
HUANG, X. Y. N85-27719
HUBBARD, R. W. N85-27521
HUBER, H. N85-27731
HUDAK, D. R. N85-27456
HUGGINS, A. W. N85-27493
HUGHES, R. G. N85-27530
HUGHLETT, E. C. N85-27551
HUIKUN, Y. N85-27304
HULTQVIST, B. N85-27697
HUMPHLETT, P. E. N85-27765
HUNDLEY, N. H. N85-26990
HUNTER, C. A. N85-27345
HURST, M. P. N85-27065
HURWITCH, J. N85-27151
HUTH, G. K. N85-26841
HYER, M. W. N85-26926
N85-26927
HYNES, R. J. N85-26756

I

IGNATYEV, P. P. N85-26791
IKROTOV, A. N85-26779
ILIN, S. V. N85-27076
INGLSPERGER, A. N85-27731
INNES, R. A. N85-27017
INOSTROZAV., H. M. N85-27331
N85-27504
INOUE, K. N85-26621
IOFFE, A. F. N85-27036
IONOV, V. I. N85-27156
IPSEN, I. C. F. N85-27596
ISAACS, L. T. N85-27396
ISAEV, Y. G. N85-27235
ISHIGURO, T. N85-26632
ISHII, M. N85-27232
ISOGAI, K. N85-26630
IUTINSKI, F. E. N85-27017
IVANOV-KHOLODNYY, G. S. N85-26799
IWAMIYA, T. N85-26614
IWASAKI, R. S. N85-26841
IYUDIN, A. F. N85-26796
N85-26806
IZRAYLEVICH, I. L. N85-26809

J

JACEY, M. N85-27525
JACKSON, T. W. N85-26717
JACOCKS, J. L. N85-26672
JAEGGY, B. C. N85-27216
JAHODA, K. N85-27785
JAMES, R. H. N85-26955
JAMET, J. N85-26932
JANKUS, E. R. N85-27537
JAWORSKE, D. A. N85-26921
N85-26992
JAYACHANDRAN, T. N85-27484
JEANNIN, P. F. N85-27339
JEFTMAN, K. N85-27812
JENNINGS, R. D. N85-27159
JENSEN, C. K. N85-27351
JENSEN, F. N85-27353
JENSEN, G. A. N85-26764
N85-26765
JEONG, J. N85-26999
JIABAO, W. N85-27303
JOHANSSON, A. N85-27440
JOHNSON, D. R. N85-27002
JOHNSON, E. E. N85-26951
JOHNSON, J. A. N85-27367
JOHNSON, L. D. N85-26955
JOHNSON, R. L. N85-26905
JOHNSTON, B. I. N85-27342
JOHNSTON, D. E. N85-26733
JOHNSTON, M. H. N85-26875
JONES, C. W. N85-27154
JONES, M. E. N85-27152
JONES, P. D. N85-27486
JONES, W. D. N85-26949
JORDAN, E. H. N85-27263
JOSHI, C. N85-27214
JURGENS, R. F. N85-27103
JYONOUCHI, T. N85-26629

K

KABACOFF, L. T. N85-26967
KADIROV, F. A. N85-27312
KADISH, A. N85-27152
KAERNAE, T. N85-27276
KAHN, P. H. N85-27411
KALENOVA, V. I. N85-26785
KALSI, S. S. N85-27696
KAMIYA, S. N85-26615
KAMSTRA, F. N85-27459
KANDOLA, M. S. N85-26943
KANE, R. P. N85-27478
KANEKO, S. N85-27678
KAPLIN, V. A. N85-26796
KAPTSOV, A. N. N85-26825
KARADZHAYEV, Y. N85-27314
KARO, A. M. N85-27656
N85-27657
KARPP, R. R. N85-27019
KASHCHENKO, N. M. N85-26797
KASPER, H. J. N85-26865
KASPER, R. G. N85-27149
KATS, L. N. N85-26812
KATSURA, S. N85-27025
KATZ, J. N85-26671
KATZ, T. J. N85-26997
KAUFMAN, L. N85-27565
KAUFMANN, P. N85-27815
N85-27816
KAUL, J. N85-26755
KAUL, U. K. N85-26672
KAUSHAL, D. N85-27092
KAUTTO, A. N85-27668
KAVI, K. M. N85-27543
KAY, P. N85-27762
KAYSER, S. N85-27803
KAZNACHEYEV, Y. V. N85-26781
KEARNS, T. G. N85-27536
KEENAN, T. E. N85-27087
KEHR, J. N85-27811
KELLENBERGER, W. N85-27256
KELLER, T. M. N85-26988
KELLOGS, P. J. N85-27802
KELLY, P. M. N85-27486
KELLY, T. J. N85-27426
KELMAN, V. M. N85-27054
KENNEDY, J. V. N85-27017
KEPPEL, W. J. N85-27251
KERBEL, G. D. N85-27691
KERKHOVEN, T. N85-27708
KERUT, E. G. N85-27338
KESSELMAN, P. M. N85-27632
KEY, S. W. N85-27273
KHALIFA, M. H. N85-27558
KHANDOVLETOV, I. N85-27313
KHOLSHEVNIKOV, K. V. N85-26793
KHUDYAKOV, S. A. N85-26813
KIDO, K. N85-27024
KIEFLING, L. N85-26883
KIKUCHI, K. N85-26620
KILLEEN, J. N85-27687
KILLMAN, B. J. N85-26881
KIM, C. D. N85-27024
KIM, D. S. N85-27554
KIMBLER, D. L. N85-27154
KINDEL, J. M. N85-27214
KING, J. H. N85-27784
KING, R. J. N85-26953
KIRASIROV, V. M. N85-27041
KIRBY, R. K. N85-27633
KIRCHHOFF, V. W. J. H. N85-27430
KIRCHOFF, R. A. N85-27618
KIRICHKOV, A. A. N85-27253
KIRILLOV-UGRYUMOV, V. G. N85-26796
KIRILLOVA, F. M. N85-26812
KIRK, A. N85-27105
KIRKPATRICK, J. E. N85-27552
KISEL, G. A. N85-27059
KISSEL, J. N85-27797
KLANG, E. C. N85-26927
KLEIN, P. N. N85-27539
KLEINSTEUBER, R. N85-27068
N85-27535
KLEM, J. N85-27714
KLIMAS, C. R. N85-27376
KLINK, W. H. N85-27721
KLOSKO, S. M. N85-27286
N85-27287
N85-27288
N85-27294
KNAPP N85-27507
KNAPP, K. N85-26848
KNEELAND, B. T. N85-26743
KNIGHT, D. D. N85-27177
KNISELY, C. N85-27186
KNOX, C. E. N85-26705
KOCHAROV, G. Y. N85-26776
KOCIN, P. J. N85-27471
N85-27472
KOENIG, M. N85-27490
KOEPSEL, K. M. N85-27027
KOHSE, G. N85-26971
KOLESNIK, A. G. N85-27316
KOLKERT, W. J. N85-26838
KOLOMIYTSEV, O. P. N85-26796
KOLOSKOV, N. V. N85-27044
KONDRASHEVSKIY, L. N85-26805
KONDRASHOV, N. S. N85-27066
KONDRATYEV, K. Y. N85-26821
N85-27310
KONG, J. A. N85-27369
KONO, M. A. N85-26622
KONSTANTINOV, V. D. N85-26826
KONTOBOYTSEVA, I. S. N85-26824
KOREN, B. N85-26683
KOREPANOV, V. Y. N85-26789
KORESHEV, S. N. N85-27052
KOROTKII, A. I. N85-27156
KORTE, U. N85-26739
KORTING, P. A. O. G. N85-26918
N85-26919
N85-26920
KOTLAR, A. J. N85-26944
KOTOV, Y. D. N85-26796
N85-26806
KOTSCHENREUTHER, M. N85-27694
KOTULSKI, Z. N85-27084
KOVALENKO, V. M. N85-27059
KOVAR, J. N85-27190
KOVTYUKH, A. S. N85-26786
KOVYNEVA, N. F. N85-27311
KOWALSKI, S. J. N85-27240
KOZLOVSKIY, V. D. N85-26795
KOZODEROV, V. V. N85-26821
KRAG, B. N85-26744
KRAKOVETSKIY, Y. K. N85-27315
KRAKOWSKI, R. A. N85-27692
KRAL, A. N85-27190
KRASNOKUTSKII, P. G. N85-26957
KRATENKO, Y. P. N85-26802
KRATOCHVIL, D. N85-27092
KRAUSE, J. N85-27718
KRAVCHENKO, N. F. N85-27040
KRAVTSOVA, V. I. N85-26824
KRETSCHMER, F. F. N85-27086
KRIEG, R. D. N85-27273
KRISHNAN, M. N85-27210
KRIVANDIN, V. A. N85-26957
KRONENBERGER, G. N85-27185
KRUPP, J. H. N85-27132
KRUTKO, P. D. N85-27047
KRYSOVA, S. K. N85-26960
KRYUCHKOV, M. A. N85-27039
KUCIAUSKAS, A. P. N85-27493
KUKACKA, L. E. N85-26974
KULIK, J. N85-26981
KULIKOV, N. I. N85-27048
KULIKOV, Y. N. N85-26807
KUNOW, H. N85-27806
KUTZ, R. N85-27347
KUTZER, A. N85-27795
N85-27808
N85-27809
KUWAHARA, K. N85-26616
KUZINA, A. M. N85-26829
KUZNETSOV, N. N. N85-27041
KUZNETSOV, P. F. N85-27156
KUZNETSOV, S. N. N85-26802
KYARNER, O. Y. N85-26821

L

LABAUNE, G. N85-26690
LACKEY, W. J. N85-26931
N85-27007
LAI, N. N85-27807
LAMONTAGNE, R. N85-27775
LANDIN, S. L. N85-27121
LANDIS, C. E. N85-26892
LANDIS, D. A. N85-27203

LANE, J. H. N85-26852
LANG, K. R. N85-27817
LAORCHAN, V. N85-27712
LAPENIS, S. N85-26811
LAPRUS, W. N85-27581
LAPTAS, M. H. N85-27555
LARIGALDIE, S. N85-26690
LAROCHE, P. N85-26690
LARSON, N. R. N85-27439
LASLETT, L. J. N85-27564
LATHROP, J. W. N85-27388
LATORRE, V. R. N85-26953
LAU, N. C. N85-27492
LAUB, A. O. N85-27631
LAUCHT, H. N85-27732
LAULAINEN, N. S. N85-27439
LAVOIPIERRE, G. N85-26640
LAWRENCE, R. N85-27498
LEAVER, S. G. N85-27629
LECHNER, W. N85-26652
LECOMPTE, J. L. N85-27493
LEE, C. C. N85-26891
LEE, D. Y. N85-27027
LEE, F. C. N85-26880
LEE, J. T. N85-26687
LEE, K. S. N85-26976
LEE, M. G. N85-26691
LEE, P. J. N85-27098
LEESE, G. E. N85-26964
LEGALL, J. Y. N85-27355
LEGOSTAYEV, V. P. N85-26815
LEHTO, O. N85-27625
LEINERT, C. N85-27796
LEITH, E. N. N85-27305
LENGRAND, J. N85-26676
LEONARD, J. A. N85-27378
LEONARD, L. E. N85-26764
LEONE, J. A. N85-27408
LEOVY, C. B. N85-27413
LEPORE, F. F. N85-26898
LERCH, F. J. N85-27286
N85-27288
LERCH, F. S. N85-27294
LEROUX, P. N85-27356
LEVANON, N. N85-27336
LEVIN, K. Y. N85-27074
LEVIS, C. A. N85-27089
LEVTOV, V. L. N85-26818
LEVY, G. S. N85-27805
LEWICKI, D. G. N85-27227
N85-27228
LEWIS, B. L. N85-27086
LEWIS, J. R. N85-26871
LEWIS, M. S. N85-26720
LIANG, P. Y. N85-26910
LIEBERMAN, M. N85-27012
LIEBOWITZ, H. N85-27266
LIEPINS, G. E. N85-26689
LIFSHITS, Y. B. N85-27057
LILLEY, D. G. N85-26716
N85-26717
LIN, J. N85-26864
LIN, K. T. N85-27099
LIN, W. C. T. N85-27390
LINDHOLM, F. A. N85-27383
LINDSEY, C. G. N85-27438
LINK, H. N85-27796
LINTON, D. G. N85-26853
LIPSCHUTZ, M. E. N85-26768
LIU, A. J. N85-26973
LIU, S. H. N85-26973
LIVINGSTONE, S. D. N85-27522
LIZZA, C. S. N85-26694
LLORET, P. N85-26640
LOCKMAN, F. J. N85-27785
LODA, R. T. N85-27013
LOETSTEDT, P. N85-27580
LONG, D. D. N85-27158
LONG, E. L., JR. N85-27002
LONG, R. K. N85-26940
LONGDON, N. N85-26771
LOOYEN, J. N85-27335
LOPER, G. D. N85-27710
LOPESFILHO, A. N85-27194
N85-27195
LOPEZ, L. A. N85-27566
LORCH, D. N85-26688
LORCH, D. L. N85-26684
LORENZINI, E. N85-26854
LOTOVA, N. A. N85-26795
LOURIE, M. N85-26849
LOYEVSKIY, A. S. N85-26787
LOZAR, C. C. N85-27534
LUBITZ, P. N85-27011
LUJAN, R. E. N85-27692
LUNDBERG, L. B. N85-26972
N85-27179
LUPENKO, A. N85-27309
LUTHER, F. M. N85-27487
LUTZ, B. L. N85-27782
LYGRE, A. N85-27344
LYZENGA, G. A. N85-27588

M

MACDONALD, S. L. N85-26721
MACDOUGALL, C. S. N85-26951
MACDOUGALL, D. M. N85-27525
MACH, H. N85-27182
MACINTOSH, N. B. N85-27748
MACKEBEN, M. N85-27511
MACY, S. C. N85-27542
MADAUSS, B. J. N85-27809
MADDEN, N. W. N85-27203
MAFFEO, R. J. N85-27264
MAHADEVAN, S. N85-27405
MAHONEY, S. P. N85-26860
MAJJIGI, R. K. N85-26668
MAKI, L. R. N85-26762
MAKSHANOV, A. V. N85-26784
MALIVOIR, C. N85-26932
MALONE, D. F. N85-27203
MALYSHEV, A. B. N85-26788
MANDAL, S. N85-27593
MANILOVA, Z. N85-26776
MANTELLINETO, S. L. N85-27666
MARAM, J. N85-26908
MARCAULT, J. N85-26690
MARCHUK, G. K. N85-26821
MARCUS, H. L. N85-26928
MARIANI, F. N85-27800
MARK, J. G. N85-26647
MARKOV, B. N85-27073
MARSH, J. G. N85-27285
MARTENS, J. H. M. N85-26986
MARTIN, C. R. N85-27000
MARTIN, D. G. N85-27559
N85-27560
N85-27561
MARTIN, D. H. N85-27626
MARTINDALE, W. R. N85-26759
MARTINEZ, B., JR. N85-27173
MASAMUNE, S. N85-27677
MASHIKO, J. N85-27025
MASHIKO, S. N85-27025
MASKOW, J. N85-27736
MASSELINK, W. T. N85-27714
MASTIN, G. A. N85-27200
MATE, B. R. N85-27347
MATE, M. L. N85-27347
MATEJCZYK, D. E. N85-26864
MATOUSEK, S. N85-27190
MATOUSHEK, R. J. N85-27199
MATSUMOTO, M. N85-27186
MATSUNO, K. N85-26632
MATSUOKA, A. N85-27677
MATTHAEUS, W. H. N85-27784
MATTHEW, W. T. N85-27521
MATTOS, J. D. N85-27194
MATYASH, Y. I. N85-27089
MAURER, R. E. N85-26877
MAYER, H. G. N85-27220
MAYER, K. S. N85-27402
MAZITOV, V. V. N85-27038
MAZUR, J. H. N85-27714
MCBRAYER, J. D. N85-27155
MCCAMMON, D. N85-27785
MCCLENDON, L. T. N85-27633
MCCLINTOCK, F. A. N85-27269
MCCLURE, D. N85-27108
MCCONATHY, R. K. N85-27401
MCCORMICK, G. P. N85-27629
MCCORMICK, M. P. N85-27422
MCCORMICK, T. J. N85-26915
MCCOY, M. C. N85-27495
MCCOY, M. G. N85-27691
MCDONALD, F. B. N85-27807
MCELIECE, R. J. N85-27101
MCGALLIARD, G. R. N85-27230
MCGEE, O. S. N85-27457
MCGEHEE, J. R. N85-26749
MCGEVNA, V. G. N85-27125
MCGINNESS, H. N85-27107
MCGINNESS, W. G. N85-26938
MCGOVERN, F. N85-26849
MCGRAW, J. R. N85-27563
MCGUIGAN, S. N85-27709
MCHARGUE, C. J. N85-26983
MCKNIGHT, R. L. N85-27261
MCLALLIN, K. L. N85-26902
MCLAREN, B. E. N85-27415
MCLAUGHLIN, S. B. N85-27401
MCLELLAN, R. B. N85-26989
MCMILLAN, O. J. N85-27170
MCMINN, W. B., JR. N85-27114
MCMONAGLE, D. R. N85-26735
MCNAMARA, B. N85-27687
MCNERNEY, G. M. N85-27485
MCPHERSON, W. B. N85-26870
N85-26873
MCREYNOLDS, M. C. N85-26760
MCRUER, D. N85-26733
MCWHORTER, P. J. N85-27155
MEEK, T. T. N85-27003
N85-27769
MEIROVITCH, L. N85-26850
MEISEL, L. V. N85-27150
MEISSNER, D. N85-27732
MELDRUM, D. J. N85-27340
N85-27342
MENACHER, F. N85-27186
MENDOZA, J. D. N85-27750
MEQUSAR, J. N85-26971
MERKLE, K. L. N85-26978
MERRIGAN, M. A. N85-27179
MERRYFIELD N85-27464
METZLER, D. H. N85-27696
MEYER, C. D., JR. N85-27621
MICHA, D. A. N85-27207
MICHAELSON, S. M. N85-27131
N85-27134
MICHALSKY, J. J. N85-27439
MIDDLEDITCH, J. N85-27788
MIJOVIC, J. N85-26989
MIKES, F. N85-26995
MIKHAILOW, V. S. N85-27222
MIKISHA, A. M. N85-26817
MILEANT, A. N85-27104
MILES, G. A. N85-26709
MILINEVSKIY, G. P. N85-26787
MILLER, C. W. N85-27399
MILLER, H. C. N85-26955
MILLER, M. S. N85-26944
MILLER, R. K. N85-26848
MILLS, R. L. N85-27596
MINEYEV, V. V. N85-26802
MINYAYLO, N. F. N85-26810
MIRER, S. A. N85-26782
MISHEV, D. N85-26834
MITCHELL, J. C. N85-27137
MIYAZAKI, T. N85-27678
MIYOSHI, K. N85-26991
MOCHALOV, V. A. N85-27253
MODEN, J. R. N85-27376
MONTEIRODOVALE, J. L. N85-27776
N85-27777
MONTES, A. S. N85-27195
MONTGOMERY, H. E. N85-27325
MOONEN, W. A. J. N85-26704
N85-27009
MOORE, J. N85-26712
MOORE, R. B. N85-26656
MOORE, S. E. N85-26858
MOORHOUSE, D. J. N85-26757
MORAIS, C. R. G. N85-26858
MORAN, G. W. N85-27609
MORAN, W. A. N85-26742
MOREA, S. F. N85-26862
MOREIRA, M. A. N85-27545
MORGAN, T. J. N85-27658
MORI, W. B. N85-27214
MORKOC, H. N85-27714
MOROKOV, V. I. N85-27156
MOROZ, A. F. N85-26812
MOROZOV, V. M. N85-26785
MOROZOVA, Y. I. N85-26801
MORRISON, P. J. N85-27694
MOSHENSKAYA, I. N. N85-26960
MOSKALENKO, G. M. N85-26814
MOSKALENKO, N. I. N85-27310
MOSTEK, A. N85-27427
MOURA, A. D. N85-27477
MOWREY, C. N85-26995
MOYER, D. S. N85-26895
MOYSYA, R. I. N85-26787
MUELLER, D. W. N85-27658
MUELLER, I. I. N85-27424
MUELLER, T. J. N85-26868
MUELLER, W. N85-27236
N85-27363
MUHAMMAD, H. N85-26729
MUHLEMAN, D. O. N85-27095
MUKHAMETNAZAROVA, A. N85-27314
MULHOLLAND, M. N85-27458
MULLEN, R. L. N85-27272
MULTER, E. P. N85-27402
MUNSON, H. N85-26881
MURDOCH, J. N85-27409

MURGUE, J. P. N85-26844
MURPHY, M. M. N85-27523
MURZIN, A. G. N85-27053
MUSAYEV, A. A. N85-26784
MUSMANN, G. N85-27799
MYERS, T. T. N85-26733
MYNARD, R. C. N85-27692
MYSHLYAEV, L. P. N85-27573

N

NABEREZHNYKH, V. V. N85-26960
NADUBOVICH, Y. A. N85-27315
NAGAMATSU, H. T. N85-26665
NAGANO, S. N85-26618
NAGATA, A. N85-27677
NAGIN, F. G. N85-27594
NAITOU, H. N85-27676
NAKAMURA, M. N85-26623
NAKAMURA, T. N85-26621
NAKAYAMA, K. N85-27511
NAPOLITANO, M. N85-27172
NEATHAMMER, R. D. N85-27534
NEBBELING, C. N85-26682
N85-27187
NECHAYEV, O. Y. N85-26800
NEIVA, E. J. F. N85-27477
NELEPO, Y. N85-26819
NELSEN, R. E. N85-26633
NELSON, B. A. N85-26760
NELSON, D. A. N85-27637
NELSON, G. N85-27459
NELSON, O. R. N85-27433
N85-27434
NEMISH, Y. N. N85-27069
NEPOMECHIE, R. I. N85-27722
NERGAARD, N. S. N85-27341
NESMYANOVICH, I. A. N85-26799
NESS, N. N85-27800
NETHERWOOD, P. H., JR. N85-27015
NEUBAUER, F. M. N85-27799
NEUDECKER, J. W. N85-26770
NEUGOMONOV, Y. N. N85-27038
NEUGROSCHEL, A. N85-27383
NEUPERT, W. M. N85-26852
NEW, L. N85-26879
NEWHALL, X. X. N85-27095
NEWMAN, R. N85-27567
NICHOLSON, S. N85-26712
NICKERSON, E. C. N85-27496
NIEBERDING, W. C. N85-26903
NIEL, M. N85-26806
NIELL, A. E. N85-27095
NIERO, M. N85-27321
NIKITIN, M. A. N85-26797
NIKLOWITZ, W. J. N85-27518
NIKOLAYEV, G. N85-27072
NIKOLAYEV, V. D. N85-26815
NIKOLSKIY, G. M. N85-26799
NILSEN, P. W. N85-26841
NISHIDA, Y. N85-27679
NOBRE, C. A. N85-27477
NOLAN, R. W. N85-27522
NORBY, R. J. N85-27401
NORDEMANN, D. J. R. N85-27431
N85-27436
N85-27666
NORMAN, D. C. N85-26756
NORRIS, M. A. N85-26850
NOVAES, R. A. N85-27328
N85-27329
NOVAK, J. H. N85-27033
NOYES, H. P. N85-27720

O

OCCELLI, M. I. N85-27017
OCONNOR, G. M. N85-26696
ODAKA, T. N85-26625
ODONNELL, M. T. N85-27577
OEHRN, N. Y. N85-27207
OERTEL, H. N85-27646
OGAWA, K. N85-27677
OHR, S. Y. N85-26689
OKHLOPKOV, V. P. N85-26791
OKUDA, T. N85-27681
OKUMURA, J. N85-26629
OLIVER, G. A. N85-27012
OLSON, A. R. N85-27410
OLYAK, V. D. N85-26957
ONKEN, R. N85-26652
OSBORNE, W. Z. N85-27654
OSHER, S. N85-27589
OSHIMA, K. N85-26812
OSHIYAMA, H. N85-27677
OSTDIEK, P. H. N85-27209
OVARLEZ, H. N85-27339
OWCZAREK, S. N85-27244
OWEN, T. N85-27782
OWENS, R. L. N85-27121
OYARCABEL, E. G. N85-27334

P

PAALVAST, C. G. N85-27279
PADFIELD, G. D. N85-26737
PAIGE, C. C. N85-27631
PAILLET, L. N85-27488
PALLINI, R. A. N85-26877
PALMADE, J. L. N85-26836
PALMBERG, B. N85-27277
PANAGIARIS, V. N85-27759
PANASYUK, M. I. N85-26786
PANGBORN, R. N. N85-27274
PANNERT, W. N85-27661
PANOV, B. F. N85-27061
PANSYUK, V. I. N85-27049
PAPADAKIS, J. S. N85-27605
PAPROCKA-GARLICKA, W. N85-27241
PARADA, N. D. J. N85-27328
N85-27329
N85-27332
PARLOW, G. C. N85-26983
PARPAROV, Y. G. N85-27574
PARR, R. A. N85-26875
PARREIRAS, E. M. D. M. F. N85-27321
PARRY, R. H. G. N85-27239
PARTS, L. N85-26998
PARZHIN, S. N. N85-27310
PATTERSON, J. C., JR. N85-26867
PATTERSON, R. H. N85-27087
PATTERSON, W. J. N85-26990
PATTON, J. F. N85-27523
PAULSON, M. R. N85-27671
PAVLENKO, I. I. N85-27037
PAVLOV, A. V. N85-27052
PAYNE, G. L. N85-27721
PEARCE, E. M. N85-26989
PEHL, R. H. N85-27203
PEI, D. Y. N85-27097
PELACCIO, D. G. N85-26898
PELEGRIN, M. N85-26731
PELLEGRINO, S. R. M. N85-27327
N85-27474
N85-27475
PENDERGRASS, J. H. N85-27215
PENG, Y. K. M. N85-27689
N85-27695
N85-27696
PENNYCOOK, S. J. N85-27716
PENNYPACKER, C. R. N85-27788
PEREIRA, E. B. N85-27431
N85-27436
PEREIRA, J. A. G. N85-27327
N85-27474
N85-27475
N85-27590
N85-27591
PERKINS, M. D. N85-27412
PERONDI, L. F. N85-27701
N85-27702
PERRY, G. E. N85-27765
PERUGINI, N. E. N85-26697
PETER, W. N85-27152
PETERLE, J. N85-27364
PETERSEN, R. A. N85-27427
PETRENKO, Y. P. N85-27253
PETRICKA, R. S. N85-26700
PETSCHEK, A. G. N85-27791
PFEIFER, H. J. N85-27489
N85-27490
PHANEUF, R. A. N85-27658
PHATAK, A. V. N85-26691
PICHA, G. J. N85-27508
PINDZOLA, M. S. N85-27658
N85-27711
PINTO, O., JR. N85-27437
PISARENKO, N. F. N85-26801
PITAK, O. N85-27190
PITZ, E. N85-27796
PLOTNIKOV, I. Y. N85-26801
POCHTAR, Y. S. N85-27041
PODGORNYY, I. M. N85-26790
POKHVISNEV, Y. V. N85-26959
POLETAYEV, Y. V. N85-27219
POLLARA, F. N85-27100
N85-27101
POLYAKHOVA, Y. N. N85-26816
POLYDOROS, A. N85-26841
POLYZOU, W. N. N85-27721
POOLE, S. R. N85-26835
POPOV, L. N. N85-27315
POPOV, V. L. N85-26812
PORSCHE, H. N85-27794
POSNER, E. C. N85-27094
POTANIN, Y. N. N85-26790
POUPINET, G. N85-27350
POVINELLI, L. N85-26897
POWELL, A. G. N85-26710
POWELL, P. N85-27762
POWELL, R. C. N85-27208
POWERS, B. G. N85-26747
PRATT, J. R. N85-26996
PRELEC, K. N85-27693
PRESTON, O. W. N85-26760
PRESTON, R. A. N85-27095
PREUSS, H. N85-27365
PRICE, D. N85-26654
PRIESTLEY, R. N. N85-26661
PRIETO, N. E. N85-27000
PRIMACK, J. R. N85-27786
PROZOROVSKIY, S. V. N85-26812
PRYOR, D. E. N85-26909
PSHENICHYKH, V. P. N85-27222
PUIGH, R. J. N85-26982
PUMMER, H. N85-27670
PUTNEY, B. H. N85-27289
PYPER, J. W. N85-26952

Q

QIU, O. N85-26729
QUACH, C. T. N85-27109
QUENTMEYER, R. J. N85-26867
QUINLIVAN, R. N85-26732
QUINN, R. D. N85-26850
QUINTIERE, J. G. N85-27034
QUIRK, M. P. N85-27103

R

RABBIA, G. N85-27348
RABIN, U. H. N85-26743
RACAPE, J. F. N85-27354
RAEFSKY, A. N85-27588
RAFFIN, M. N85-26676
RAMANATHAN, A. N85-27592
RAMM, N. S. N85-26829
RAMSEY, J. E., JR. N85-27576
RAMVAUD, R. N85-27195
RAO, G. V. R. N85-26898
RATAJCZAK, A. F. N85-27386
RATEKIN, G. H. N85-26898
RATLIFF, A. W. N85-26899
RAYALU, G. K. N85-27194
N85-27195
REDDAN, J. G. N85-27559
N85-27560
N85-27561
REDDY, J. F. N85-26978
REDFORD, J. S. N85-27761
REDMAN, C. M. N85-26763
REED, I. S. N85-27097
REEVES, C. A., JR. N85-27540
REID, L. D. N85-26730
REID, R. L. N85-27698
REIF, J. H. N85-27539
N85-27608
N85-27630
REILLY, M. N85-26656
REIMANN, R. N85-27030
REIS, E. N85-26995
REKOV, A. M. N85-27254
RENNE, D. S. N85-27483
RESCH, D. N85-27078
RESHOTKO, E. N85-26666
RESSEGUIER, J. N85-26646
REYN, J. W. N85-26680
REYZMAN, S. Y. N85-26786
RHEA, J. O. N85-27493
RHODES, C. K. N85-27670
RICHARD, P. N85-26690
RICHARDS, W. R. N85-26738
RICHARDSON, D. D. N85-26837
RICHARDSON, D. L. N85-27547
RIEDEL, C. N85-26825
RIEDINGER, L. L. N85-27652
RIEMER, J. R. N85-26724
RIGGS, S. R. N85-27404
RILEY, J. F. N85-27395
RING, P. N85-27661
RIPHAGEN, H. A. N85-27448
N85-27460

RISING, J. J. N85-26745
RITCHIE, D. N85-27340
ROBERTS, D. E. N85-27525
ROBERTS, N. J., JR. N85-27131
N85-27134
ROBERTSON, S. J. N85-26899
ROBINSON, C. P. N85-26706
ROBINSON, D. L. N85-27096
ROBINSON, D. N. N85-27260
ROBINSON, M. T. N85-27662
ROBINSON, S. W. N85-27488
ROCH, J. L. N85-26650
RODNIKOVA, I. V. N85-27054
RODRIGUES, P. N85-27669
ROHRS, R. J. N85-27115
ROLEY, R. E. N85-27603
ROMANOVSKIY, Y. A. N85-26787
ROSATI, V. J. N85-27142
ROSENBAUER, H. N85-27798
ROSENBERGER, G. N85-26965
ROSENFELD, A. N85-27753
ROSENKRANZ, P. W. N85-27489
ROSNER, D. E. N85-27184
ROSS, J. C. N85-26672
ROSSMEISL, R. A. N85-26970
ROTH, K. E. N85-27696
N85-27323
ROUSH, T. L. N85-26663
ROUSSEAU, J. N85-27482
ROVERO, P. J. N85-27415
ROWE, S. P. N85-26770
ROWLEY, J. C. N85-26822
ROZANOV, V. V. N85-27744
RUCKER, W. N85-26958
RUDSKOI, A. I. N85-27095
RUDY, D. J. N85-27647
RUIJGROK, G. J. J. N85-27036
RUMYANTSEV, V. D. N85-26971
RUNKLE, J. N85-27180
RUPERT, J. G. N85-27602
RUPPERT, D. N85-27610
RUSH, D. S. N85-27109
RUSKIN, A. M. N85-27426
RUSSELL, C. T. N85-27274
RUUD, C. O. N85-26787
RUZHIN, Y. Y. N85-27042
RYABOV, A. M. N85-27075
RYBAKOV, N. N85-26822
RYZHIKOV, G. A.

S

SAAD, Y. N85-27556
N85-27598
SACHKOV, L. B. N85-27043
SADYGOV, E. M. N85-27235
SAHAI, Y. N85-27435
N85-27479
SAIDOV, K. K. N85-26792
SAIN, M. K. N85-26713
N85-26714
N85-26715
SAITBATTALOV, A. A. N85-26780
SALMOND, D. J. N85-27600
SAMET, H. N85-27753
SAMMY, M. N85-27161
SAMPAIO, D. R. N85-26841
SAMUELSEN, G. S. N85-26945
SANDRI, S. A. N85-27519
SANDUSKY, W. F. N85-27483
SANNER, R. D. N85-27572
SARYCHEV, V. A. N85-26777
N85-26782
SATO, K. I. N85-27677
SATO, R. N85-27023
SATO, T. N85-27213
SATOFUKA, N. N85-26626
SATYAMURTY, P. N85-27476
SAULIN, K. I. N85-26815
SAULNIER, J. N85-27674
SAVAGE, M. N85-27227
N85-27228
SAVCHENKO, P. P. N85-26798
SAVENKO, I. A. N85-26800
SAVICHEV, V. V. N85-26818
SAVITSKAYA, S. Y. N85-26774
SAVRANSKAYA, E. S. N85-27156
N85-27157
SAWADA, K. N85-26629
SAWICKI, T. N85-26956
N85-27242
SAWYER, R. F. N85-26948
SAZONENKO, V. A. N85-27042
SCALISE, E., JR. N85-27776
N85-27777
SCEARCE, C. N85-27800
SCHAAL, R. E. N85-27776
SCHAFFAR, M. N85-27645
SCHAFFHAUSER, A. C. N85-27002
SCHEEL, H. J. N85-27703
SCHEUBLE, B. N85-27718
SCHIFF, L. B. N85-26671
SCHIJVE, J. N85-26984
N85-27283
SCHILLER, C. M. N85-27415
N85-27419
SCHNABEL, R. B. N85-27568
SCHNEIDER, H. G., III N85-27229
SCHNEIDER, I. N85-27192
SCHNURR, N. M. N85-27692
SCHOEN, M. L. N85-26760
SCHOEVER, H. F. R. N85-26918
N85-26919
N85-26920
N85-26954
SCHOUTEN, G. N85-27614
SCHREIBER, R. K. N85-27402
SCHREINER, B. N85-26659
SCHRICK, K. W. N85-27366
SCHUBERT, R. P. N85-27395
SCHULMAN, J. R. N85-26852
SCHULTZ, M. H. N85-27598
N85-27641
SCHULZ, R. B. N85-27002
SCHUTZENHOFER, L. A. N85-26886
SCHWAB, J. R. N85-26901
SCHWAB, M. J. N85-27415
N85-27416
SCHWANK, J. R. N85-27155
SCHWARTZ, S. C. N85-27124
N85-27607
SCHWEGLER, H. F. N85-26659
SCHWEINFURTH, G. N85-27367
SCHWENN, R. N85-27798
SCOFIELD, R. A. N85-27499
SEALS, R. D. N85-26951
SEIDEL, B. L. N85-27805
SEILER, F. N85-27183
SEINFELD, J. H. N85-27406
SELEGAN, D. R. N85-26757
SELFRIDGE, R. H. N85-27205
SELLA, F. N85-26755
SELLER, J. N85-26861
SELWOOD, R. K. N85-26965
SEMENOV, G. B. N85-27052
SEMENOV, I. A. N85-26790
SENKEVICH, V. N85-26830
SENNA, J. R. N85-27702
SEVESTRE, C. N85-26635
N85-26636
N85-26637
SEXTON, F. W. N85-27155
SHAFER, Y. G. N85-26801
SHAFIR, A. M. N85-27574
SHAMBON, C. N85-26806
SHANK, D. E. N85-26769
SHANKARAN, R. N85-27250
SHAPIRO, A. J. N85-26645
SHAROVA, V. A. N85-26808
SHATOV, A. A. N85-26959
SHAVRIN, P. I. N85-26800
SHEATHER, S. J. N85-27553
SHECHTMAN, D. N85-26961
SHEEM, S. K. N85-27140
SHEFFIELD, J. N85-27684
SHEPPARD, D. N85-27151
SHETTY, A. N. N85-27001
SHETTY, C. M. N85-27595
SHETUKHIN, V. L. N85-27056
SHIAU, T. N. B. N85-26698
SHIFRIN, Y. A. N85-27045
SHILLINGTON, F. A. N85-27461
SHILOV, V. M. N85-26812
SHIMABUKURO, F. I. N85-27110
SHIMANOVICH, M. A. N85-27046
SHINNICK, F. M. N85-27091
SHIRLEY, J. A. N85-26904
SHMAKOV, V. P. N85-27056
SHOEMAKER, W. L. N85-27284
SHOSHANI, A. N85-27763
SHUBNIKOV, Y. I. N85-27052
SHUGAL, Y. V. N85-26806
SHUM, L. N85-27549
SHUMILOV, N. A. N85-27315
SHUTE, A. C. N85-26766
SHVIDKOVSKAYA, T. Y. N85-26791
SIBUNKA, J. D. N85-27506
SIDNER, C. N85-27579
SIEGEL, R. W. N85-27710
SIEGWARTH, J. D. N85-26905
SIELAWA, J. T. N85-27703
SIGAL, L. L. N85-27401
SILS, I. V. N85-27521
SILVERA, I. F. N85-27667
SILVERMAN, M. J. N85-27506
SIMILA, G. W. N85-27175
SIMMON, D. A. N85-26705
SIMMONS, R. C. N85-27503
SIMON, M. N85-27104
SINDO, H. N85-27677
SIQUEIRA, M. A. A. N85-27194
N85-27195
SISCOE, G. L. N85-27426
SISLIOGLU, M. N85-27601
SIVAVEC, T. M. N85-26997
SJOREEN, T. P. N85-27201
SKARDA, J. R. N85-27463
SKINNER, J. P. N85-27116
SKLAD, P. S. N85-26983
SKLYAROVA, G. I. N85-27042
SKORODUMOV, A. P. N85-26829
SKOTAROVSKIY, V. S. N85-26787
SKUDRIDAKIS, J. N85-26744
SLABY, J. G. N85-27769
SLAUGHTER, D. N85-27673
SLEIGH, A. C. N85-27599
SLICKER, J. M. N85-27771
SLOCUM, A. H. N85-27269
SLODERBACH, Z. N85-26956
SMEDFJELD, J. B. N85-26703
N85-26725
N85-26726
N85-26727
SMEDSKJAER, L. C. N85-27710
SMIRNOV, V. N. N85-26809
SMIRNOV, Y. V. N85-26796
SMITH, E. J. N85-27426
SMITH, J. A. N85-27275
SMITH, M. S. N85-27765
SMITH, R. A. N85-27524
SMITH, T. B. N85-27407
SMITH, T. E. N85-27118
SMYTH, W. H. N85-27468
SNELL, R. J. V. N85-26653
SNIDER, C. R. N85-27498
SNOHA, D. J. N85-27274
SOBRAL, J. H. A. N85-27434
SOKOLOV, L. L. N85-26793
SOKOLOV, V. N. N85-27042
SOLANTIE, R. N85-27473
SOLDAKOVA, N. A. N85-27053
SOLOMON, L. N85-27415
SOLOTCHIN, A. V. N85-27060
SOLOVEV, V. I. N85-27573
SOLOVYEV, M. N. N85-26828
SOMMA, R. N85-26643
SOMMER, E. N85-27489
N85-27490
SOSHNIKOV, V. G. N85-27055
SOSNOVETS, E. N. N85-26766
SPAMPINATO, P. T. N85-27696
SPARROW, K. J. N85-27548
SPAULDING, W. G. N85-27488
SPAYD, L. E., JR. N85-27499
N85-27278
SPIES, G. J. N85-27686
SPONG, D. A. N85-27405
SPRINKEL, J. N85-26096
ST.CLAIR, T. L. N85-27469
STAELIN, D. H. N85-26977
STANALAND, V. A. N85-27095
STANDISH, E. M. N85-26936
STANTON, A. C. N85-26759
STARR, R. F. N85-27092
STEINNAGEL, K. N85-26810
STEKLOV, A. F. N85-27905
STELZRIED, C. T. N85-27613
STENBERG, R. N85-27039
STEPANSKIY, L. G. N85-26784
STEPANYUK, O. M. N85-27165
STETZ, T. T. N85-27331
STEVENSON, M. R. N85-27504
N85-26950
STIMETZ, C. J. N85-27416
STIMPFLE, R. M. N85-26931
STINTON, D. P. N85-27007
N85-27119
STOCKTON, D. B. N85-27803
STONE, R. N85-26875
STRIZAK, J. P. N85-26897
STRUCK, H. N85-26974
SUGAMA, T. N85-27679
SUGIHARA, R. N85-27681
N85-27604
SUH, M. T. N85-26815
SUKHOVOY, M. B. N85-27060
SULEYMANOV, S. N85-27550
SULLIVAN, B. J. N85-27574
SULMAN, L. A.

SUMMERS, L. G. N85-26760
SUNDARAM, C. V. N85-26885
SUSLOV, A. A. N85-26800
SUTEDJO, B. N85-27752
SUTOVSKIY, V. M. N85-26823
SUTTON, R. D. N85-26709
SVANEMSELLEM, K. N85-27353
SWAGER, R. N85-27397
SWANSON, B. W. N85-27709
SWANSON, L. N85-27099
N85-27101
SWIERSTRA, S. N85-26651
SYED, S. A. N85-27584
SZENTIRMAY, M. N. N85-27000
SZLYK, P. C. N85-27521

T

TAAGHOLT, J. N85-27353
TABATABAIE-ALAVI, K. N85-27698
TAGUCHI, M. N85-27678
TAKAHASHI, H. N85-27435
N85-27479
TAKAHASHI, T. N85-26614
TAKAMURA, S. N85-27681
TAKANASHI, S. N85-26631
TAKASHIMA, A. M. N85-27666
TALBOT, J. M. N85-27517
TALBOT, S. S. N85-27372
TAMARU, K. N85-27677
TAMURA, A. N85-26820
TANAKA, K. N85-26828
N85-26991
TANAKA, N. M. N85-26856
TANAKA, S. N85-27681
TANAKURA, Y. N85-26815
TANIOKA, T. N85-26827
TAPPAN, D. N85-27525
TARIQ, S. N85-27147
TARNOVSKII, A. I. N85-27219
TAVIS, M. T. N85-27110
TAYLOR, G. E. N85-27401
TAYLOR, H. F. N85-27141
TAYLOR, S. R. N85-27508
TEIXEIRA, N. R. N85-27479
TEKAMPE, R. C. N85-27751
TENNERY, V. J. N85-27002
TENOPIR, C. N85-27747
TERENZI, R. N85-27800
THAYER, M. N85-27409
THOENES, J. N85-26899
THOMAS, C. N85-27236
THOMAS, H. J. N85-27255
THOMAS, J. M. N85-26863
THOMAS, R. A. N85-27153
THOMAS, R. N. N85-27709
THOMASSON, R. E. N85-26756
THOMPSON, E. E. N85-27415
THOMPSON, R. G. N85-26876
THOMPSON, R. L. N85-27264
THOMSEN, K. E. N85-27122
THUE, R. E. N85-27582
TIBSHIRANI, R. J. N85-27620
TICHLER, J. L. N85-27760
TICHTINSKY, H. N85-26719
TIEGS, T. N. N85-26930
TILLER, B. N85-26879
TILLMAN, P. R. N85-26656
TIMOSHKOVA, Y. I. N85-26793
TINGEY, D. T. N85-27403
TIRSELL, K. G. N85-27688
TITOV, V. B. N85-26793
TOBAK, M. N85-27167
TOLES, R. D. N85-26735
TOOMRE N85-27464
TORENBEEK, E. N85-26681
TOROCHKOV, A. V. N85-27051
TOULOUSE, P. N85-26754
TOWLER, J. B. N85-26661
TOWNSEND, A. S. N85-27154
TOWNSEND, L. W. N85-27665
TRAINOR, J. H. N85-27807
TRAVKIN, N. V. N85-27041
TREFNY, C. J. N85-26710
TRETYAKOV, V. Y. N85-26823
TRIJONIS, J. N85-27409
TROTH, D. L. N85-26709
TRUJILLO, P. B. N85-27664
TRUONG, T. K. N85-27097
TSAPKO, V. K. N85-27234
TSARAPKIN, N. N85-27308
TSVETKOV, A. D. N85-27053
TSYMKOVSKIY, A. Z. N85-27074
TUCKER, D. S. N85-27789
TUMANOV, A. N. N85-27157
TUNG, C. N85-26669
TUOMINEN, S. M. N85-26972
TYGAR, J. D. N85-27608
TYNER, R. N85-26849
TYSHKEVICH, V. G. N85-26796

U

UCCELLINI, L. W. N85-27427
N85-27471
N85-27472
UCKAN, T. N85-27685
UDALOV, S. N85-26841
UDERMANN, H. N85-27507
ULABY, F. T. N85-27320
ULRICH, G. N85-27733
ULYANOV, Y. G. N85-26815
UNDERWOOD, D. L. N85-26708
USPENSKIY, A. B. N85-26823
USRY, J. W. N85-26687

V

VAINIO, J. V. N85-27625
VAINSHTEIN, A. A. N85-27254
VALLADO, D. A. N85-26839
VANDEKIEFT, L. J. N85-27014
VANDERLINDEN, L. N85-26760
VANDERVAART, J. C. N85-26728
VANDIJK, J. H. N85-26954
VANGEER, J. N85-27615
N85-27622
VANGOOL, M. P. C. N85-26752
VANHOLLEBEKE, M. A. I. N85-27807
VANIMAN, D. T. N85-27003
N85-27789
VANLEER, B. N85-27583
VANMOORHEM, W. K. N85-27636
VANN, R. D. N85-27520
VARADAN, V. K. N85-27112
VARADAN, V. V. N85-27112
VARGA, G. M., JR. N85-27012
VARHOLA, D. W. N85-26857
VASCONCELLOS, M. B. A. N85-27436
VASHKOVYAK, M. A. N85-26778
VAZ, A. M. Z. N85-27815
VEDRENNE, G. N85-26806
VEERS, P. S. N85-27485
VEILLEUX, S. N85-27775
VEISSID, N. N85-27814
VELDKAMP, W. B. N85-27672
VELICHKO, S. A. N85-27057
VENTER, J. M. N85-27450
VERBRUGGEN, M. L. C. E. N85-26933
VERMEULEN, C. N85-26681
VERMEULEN, P. G. N85-27281
N85-27622
VERMILLION, T. R. N85-27538
VERMISSEN, J. P. M. N85-26919
VERMOREL, J. N85-27021
VERMURY, S. N85-27466
VERSMISSEN, J. P. M. N85-26918
VESELOVSKIY, I. S. N85-26794
VEST, G. M. N85-27381
VEST, R. W. N85-27381
VICKERS, R. R., JR. N85-27529
VICROY, D. D. N85-26705
VIDMACHENKO, A. P. N85-26810
VIG, J. R. N85-27143
N85-27145
N85-27146
VIJAYKUMAR, N. L. N85-27319
N85-27590
N85-27591
VILLANTE, U. N85-27800
VINOGRADOV, B. V. N85-26825
VISHNEVSKIY, N. S. N85-27038
VISHNIAC, H. S. N85-27509
VISWANADHAM, Y. N85-27428
N85-27429
VITTORIA, C. N85-27011
VOGELESANG, L. B. N85-27279
VOGT, S. T. N85-26898
VOLKERT, J. N85-27360
VOLLAND, H. N85-27805
VOLODICHEV, N. N. N85-26800
VONGOGH, R. G. N85-27462
VONPRAGENAU, G. L. N85-26894
VONSTENTZSCH, W. N85-26849
VOS, J. B. N85-26918
N85-26919
N85-27188
VYGODSKAYA, N. N. N85-26827

W

WAGNER, C. A. N85-27288
N85-27292
N85-27294
WAGNER, W. J. N85-27818
WAISMAN, E. M. N85-27174
WALKER, D. J. N85-26741
WALKER, F. D. N85-27398
WALKER, M. J. N85-26755
WALKER, N. N85-27459
WALKER, R. F. N85-27401
WALKO, R. J. N85-26970
WALLACE, T. C. N85-27789
WALTE, F. N85-27236
WALTERS, R. W. N85-27160
WALTON, R. D. N85-27154
WAMSTAD, D. B. N85-26905
WANG, J. C. N85-27005
WANG, J. J. H. N85-27123
WARD, R. C. N85-27631
WARD, R. L. N85-26852
WARREN, D. E. N85-27342
WARREN, W. E. N85-27272
WASHBURN, J. N85-27714
WATANABE, I. N85-26946
WATSON, C. R. N85-27410
WATSON, R. J. N85-27751
WATT, W. N85-27211
WAYLAND, R. L., III N85-27178
WAYNE, S. F. N85-26962
WEATHERS, C. N85-27819
WEBER, G. N85-27718
WEBER, W. N85-27358
WEINSTOCK, E. M. N85-27415
N85-27416
N85-27419
WEISS, M. N85-27124
WELGE, H. R. N85-26710
WELLEN, H. N85-27728
WELLER, A. E., III N85-27089
WELLER, J. F. N85-27141
WELLS, V. A. N85-26970
WENNEKERS, R. N85-27737
WESEMAEL, F. N85-27775
WEST, D. C. N85-27400
WHELAN, E. P. N85-26972
WHITAKER, A. B. N85-26736
WHITE, C. W. N85-26983
WHITE, G. R. N85-27743
WHITMORE, S. A. N85-26899
WIBBERENZ, G. N85-27806
WICKS, G. W. N85-27706
WIDHALM, J. W., JR. N85-26859
WIESEL, J. N85-27368
WILEY, C. L. N85-26978
WILHELM, J. N85-27532
WILHELM, K. N85-26734
WILKINS, P. G. N85-27171
WILLEY, C. S. N85-26745
WILLIAMS, D. J. N85-27239
WILLIAMS, G. M. N85-27495
WILLIAMSON, D. L. N85-27497
WILLIAMSON, G. S. N85-27497
WILLIAMSON, R. G. N85-27291
N85-27294
WILLMANN, P. A. N85-27657
WILSON, J. W. N85-27665
WILSON, N. G. N85-27202
WILSON, V. R. N85-27649
WILSON, W. B. N85-27338
WINGLER, R. L. N85-27779
WINKENS, H. P. N85-27163
WINKLER, P. J. N85-27727
WINOGRAD, N. N85-26939
WINOKUR, P. S. N85-27155
WINTER, J. S. N85-26737
WIRIYAWIT, S. N85-26935
WOLFE, E. A. N85-26896
WOLMAN, Y. N85-27572
WOOD, D. H. N85-27605
WOOD, H. G., III N85-27178
WOODARD, D. W. N85-27706
WOODING, D. H. N85-27405
WRIGHT, M. A. N85-27578
WRIGHT, R. A. N85-27003
WRIGHT, S. M. N85-26751
WU, C. L. N85-27660
WU, K. H. N85-27249
WU, S. T. N85-26862
WU, Y. S. N85-27612
N85-27723
WUN-FOGLE, M. N85-26967
WYATT, G. C. F. N85-26758
WYCHORSKI, H. N85-27773

WYETT, L. N85-26908

X

XU, X. R. N85-27469

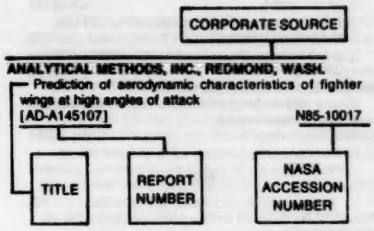
Y

YAMADA, S. N85-27677
YAMAMOTO, Y. N85-26624
YAMAZAKI, K. N85-27676
N85-27680
YARALIEV, N. G. N85-27235
YAROSHEVICH, V. A. N85-27074
YASTREBOV, V. D. N85-26783
YEGOROV, V. V. N85-26820
YEH, C. N85-27669
YEHIA, N. A. N85-27246
YIP, T. W. Q. N85-26934
YKEDA, Y. N85-27477
YODER, G. L. N85-26917
YOON, H. N85-27640
YOUNG, A. D. N85-26748
YUAN, J. M. N85-27719
YUJUN, P. N85-27302
YUROV, V. N. N85-26796

Z

ZAHNISER, M. S. N85-26936
ZALOOGUYEV, S. N. N85-26812
ZANELLA, F. N85-26849
ZARETSKY, E. V. N85-27226
ZARUTSKIY, V. A. N85-27068
ZBRUTSKIY, A. V. N85-27050
ZEE, A. N85-27612
ZELINSKI, A. N85-26965
ZEMAN, G. S. N85-27510
ZENCHENKO, V. M. N85-26806
ZHELEZNYI, V. P. N85-27632
ZHU, S. N85-27441
ZHULIN, I. A. N85-26787
ZHUZGOV, S. S. N85-26808
ZINOLABEDINI, R. N85-26921
ZISCHLER, H. N85-27360
ZLATOUSTOV, V. A. N85-26782
ZORN, E. N85-27224
ZORZI, E. S. N85-26891
ZUBAREV, V. M. N85-27064
ZUBCHENKO, A. S. N85-27219
ZUDOV, E. G. N85-27253
ZUYEV, V. Y. N85-26775
ZYLIUS, F. A. N85-26844
N85-26845

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, NEUILLY-SUR-SEINE (FRANCE).
Cost Effective and Affordable Guidance and Control Systems
[AGARD-CP-380] N85-26638
Low Reynolds number vehicles
[AGARD-AG-286] N85-26666
Technical evaluation report on the Flight Mechanics Symposium on Active Control Systems: Review, Evaluation and Projections
[AGARD-AR-220] N85-26730
The Impact of Proposed Radio Frequency Radiation Standards on Military Operations
[AGARD-LS-136] N85-27128

AERAZUR C.A., ISSY-LES-MOLINEAUX (FRANCE).
Parachute extraction device for ultralight gliders
[CH-643499-A5] N85-26663

AERODYNE RESEARCH, INC., BILLERICA, MASS.
A measurement of the vibrational band strength for the upsilon sub 3 band of the HO2 radical
[NASA-CR-175858] N85-26936
Holoswitch, phase 1
[AD-A152212] N85-27196

AERONAUTICAL RESEARCH INST. OF SWEDEN, STOCKHOLM.
Description of a computer program treating transonic steady state aeroelastic effects for a canard or tail airplane
[FFA-TN-1983-23] N85-26674
Measurements of the symmetric aerodynamic coefficients for flat faced cylinders in the angle of attack regime 0 to 90 deg for transonic and supersonic speeds
[FFA-TN-1984-04] N85-26675
On the use of marker loads for fatigue crack growth measurements
[FFA-TN-1984-52] N85-27277

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
A strain gage manual
[AD-A151902] N85-27197

AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AFB, OHIO.
Avionics integrity issues presented during NAECON (National Aerospace and Electronics Convention) 1984
[AD-A151923] N85-26707

AEROSPACE CORP., EL SEGUNDO, CALIF.
EHF attenuation derived from emission temperatures in light rain
[AD-A151166] N85-27110

AIR FORCE ARMAMENT LAB., EGLIN AFB, FLA.
Reusable software: A concept for cost reduction N85-26655

AIR FORCE ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER, SCOTT AFB, ILL.
AWS (Air Weather Service) climatic briefs: Asia
[AD-A151944] N85-27481
AWS (Air Weather Service) climatic briefs: North America
[AD-A152161] N85-27483

AIR FORCE HUMAN RESOURCES LAB., BROOKS AFB, TEX.
Trends shaping advanced aircrew training capabilities through the 1990s
[AD-A152277] N85-27530

AIR FORCE INST. OF AVIATION MEDICINE, MANCHING (WEST GERMANY).
Creating a Mobile Autonomous Robot Research System (MARRS)
[AD-A151963] N85-27229

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Autofocus motion compensation for synthetic aperture radar and its compatibility with strapdown inertial navigation sensors on highly maneuverable aircraft
[AD-A151940] N85-26693
Generation of flight paths using heuristic search
[AD-A151949] N85-26694
A replenishment phase study for the NAVSTAR global positioning system
[AD-A152030] N85-26695
Study of longitudinal landing flying qualities evaluation using pilot model theory
[AD-A152194] N85-26702
A comparison of pictorial and speech warning messages in the modern cockpit
[AD-A151917] N85-26706
Flight control system reconfiguration design using quantitative feedback theory
[AD-A151771] N85-26722
A modern control design methodology with application to the CH-47 helicopter
[AD-A151946] N85-26723
The effect of load factor on aircraft handling qualities
[AD-A152118] N85-26724
Design and specification of a local area network architecture for use in real-time flight simulation
[AD-A152242] N85-26762
Estimation of launch vehicle performance parameters
[AD-A151927] N85-26839
Model reduction techniques applied to the control of large space structures
[AD-A151784] N85-26857
The effect of inaccuracies in structural models on the control of large space structures
[AD-A151794] N85-26858
Optimal open loop and nonlinear feedback control for remote orbital capture
[AD-A151967] N85-26859
Analysis of orbit transfer vehicles for GPS Block 3 satellites
[AD-A152021] N85-26860
Application of the hydraulic system frequency response program to propellant feed systems
[AD-A151824] N85-26914
Optogalvanic measurement of even parity Rydberg levels in krypton gas
[AD-A152113] N85-26943
The development and implementation of an optical communications laboratory
[AD-A151682] N85-27111
Distributed control of circuits in multiuser communication networks with circuit precedence and path suitability criteria using failsafe routing concepts
[AD-A151825] N85-27113
Survey of narrow band vocoder technology
[AD-A151919] N85-27114
An empirical self-protection chaff model
[AD-A151928] N85-27115
Radiation and scattering of spiral antennas
[AD-A151929] N85-27116
Implementation of a real-time, interactive, continuous speech recognition system
[AD-A151936] N85-27117
Ziv-Zakai bound applied to an amplitude-comparison monopulse radar
[AD-A151937] N85-27118
Evaluating syntactic constraints to speech recognition in a fighter aircraft environment
[AD-A152117] N85-27119
A short range, high accuracy radar ranging system
[AD-A152195] N85-27122
System design of automated VLSI (Very Large Scale Integrated) test station and implementation of selected system aspects
[AD-A151961] N85-27147
Dynamic response of fluid transmission lines
[AD-A151926] N85-27171
Computer modeling of vibrational energy levels of potential laser candidates (diatomic molecules)
[AD-A151765] N85-27209
The nonlinear analysis of thick composite plates using a cubic spline function N85-27252
The nonlinear analysis of thick composite plates using a cubic spline function
[AD-A152115] N85-27268
Investigation of pseudo bi-polar nickel cadmium batteries as filter elements for pulsed power loads
[AD-A152112] N85-27389
A communications link for an implantable electrode array
[AD-A152238] N85-27510
A multipole model of the observed cerebral cortex magnetic field
[AD-A152237] N85-27526
Implementation and analysis of a microcomputer based relational database system
[AD-A151770] N85-27536
Development of computer aided database design and maintenance tools
[AD-A151782] N85-27537
The systematic integration of very large scale integrated circuit computer-aided design tools into a toolkit optimized for academic applications
[AD-A151813] N85-27538
Further development of an Interactive Control Engineering Computer Analysis Package (ICECAP) for discrete and continuous systems
[AD-A151783] N85-27546
An interactive computer package for use with simulation models which performs multidimensional sensitivity analysis by employing the techniques of response surface methodology
[AD-A151958] N85-27548
Character recognition using correlation techniques
[AD-A152006] N85-27549
Detailed design of an object oriented, multiprogramming, multitasking operating system for sixteen-bit microcomputers
[AD-A152086] N85-27552
Mathematical programming in computer network design
[AD-A152275] N85-27558
Continued development and implementation of the Universal Network Interface Device (UNID) 2, Digital Engineering Laboratory Network (DELNET), volume 1
[AD-A151935] N85-27569
Continued development and implementation of the Universal Network Interface Device (UNID) 2 in the Digital Engineering Laboratory Network (DELNET), volume 2
[AD-A151947] N85-27570
Diagnosis: Using automatic test equipment and an artificial intelligence expert system
[AD-A151918] N85-27576
Positioning of a robotic manipulator through the use of visual feedback
[AD-A151933] N85-27577
Artificial intelligence in space platforms
[AD-A152078] N85-27578
Scene analysis using recursive frequency domain correlation with energy normalization
[AD-A151777] N85-27586
Some new results on the discrete-time Riccati Equation and their use in the design of optimal regulators and observer-estimators
[AD-A151934] N85-27597

A heuristic solution to the spacing problem: Maximizing the minimum Euclidean distance among N points in a convex region
[AD-A152116] N85-27603
Adaptive grid generation for numerical solution of Burger's equation
[AD-A152217] N85-27606
An application of Markov chains to the problem of migration in inventory systems
[AD-A151954] N85-27618
Experimental investigation of the pulsed photoacoustic effect produced on a solid surface
[AD-A152114] N85-27640
Investigation of electron attachment and dissociation rates in C2F6/CH4 electric gas discharges
[AD-A151790] N85-27649
Personal computer aided decision analysis
[AD-A151911] N85-27743
Dall-Null tester for spaceborne applications
[AD-A151772] N85-27779

AIR FORCE OCCUPATIONAL AND ENVIRONMENTAL HEALTH LAB., BROOKS AFB, TEX.
The medical results of human exposures to radio frequency radiation N85-27133
Radio Frequency Radiation (RFR) measurements in operational settings N85-27138

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
The STOL and maneuver technology program integrated control system N85-26757

AIRBUS INDUSTRIE, BLAGNAC (FRANCE).
Statistical study of the dynamic analysis of the workload in the A310 certification campaign N85-27531

AKRON UNIV., OHIO.
Oil resistant silicone elastomers
[AD-131523] N85-26987
Plastic deformation of crystalline polymers
[AD-A152090] N85-26999
Dynamic response of shells and plates subjected to variable magnitude traveling loads N85-27250
Some advances in experimentation supporting development of viscoplastic constitutive models
[NASA-CR-174855] N85-27260
An improved torsional method for determining the fracture toughness of stiff materials and of adhesive joints
[AD-A152091] N85-27267

ALABAMA UNIV., BIRMINGHAM.
Relationships between microstructure and microfissuring in alloy 718 N85-26876

ALLIED BENDIX AEROSPACE, TETERBORO, N.J.
A Gimbal sizing analysis for an IPACS rotating assembly
[NASA-CR-172524] N85-26913

AMES LAB., IOWA.
Dendritic growth from amorphous matrix
[DE85-007630] N85-27712

AMTEC ENGINEERING, INC., BELLEVUE, WASH.
A method for simulating 3-D aircraft flow fields with jet plume effects
[NASA-CR-175802] N85-26884

ANALEX CORP., CLEVELAND, OHIO.
Computer program for the calculation of multicomponent convective diffusion deposition rates from chemically frozen boundary layer theory
[NASA-CR-168329] N85-27164

ANALYTICAL MECHANICS ASSOCIATES, INC., MOUNTAIN VIEW, CALIF.
Navigation and flight director guidance for the NASA/FAA helicopter MLS curved approach flight test program
[NASA-CR-177350] N85-26691

ANGSTROM ROBOTICS AND TECHNOLOGIES, INC., FLORENCE, KY.
Development of a Persistent Chemical Agent Simulator System (PCASS)
[NASA-CR-175776] N85-26936

APPLIED MEDICAL TECHNOLOGY, INC., BRECKSVILLE, OHIO.
Percutaneous connectors
[NASA-CR-175627] N85-27508

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
A phase modulation evaluation procedure for an ARGOS type signal N85-27336

ARGONNE NATIONAL LAB., ILL.
Flow-induced vibration of the SSME LOX posts: Additional issues
[DE85-007339] N85-26916
Tilt grain boundaries in NiO
[DE85-006839] N85-26978
Proposal for an extended set of FORTRAN Basic Linear Algebra subprograms
[DE85-007241] N85-27582
Squeezing the most out of Eigenvalue solvers on high-performance computers
[DE85-007569] N85-27565
Proceedings of the Workshop on Polarized Targets in Storage Rings
[DE85-002704] N85-27653
Refinements in the computation of collision probabilities
[DE85-006118] N85-27663
Positron annihilation studies of vacancy formation in tungsten, chromium, and niobium
[DE85-006837] N85-27710

ARIZONA UNIV., TUCSON.
Infrared preseneltization photography N85-27189
Finite axisymmetric deformation of a thin shell of revolution N85-27251

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
Metal armatures for railguns
[AD-A152129] N85-26838

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
Electrical resistivity in amorphous metals: Consequences of phonon ineffectiveness in the diffraction model
[AD-A152130] N85-27150

ARMY AVIATION ENGINEERING FLIGHT ACTIVITY, EDWARDS AFB, CALIF.
Preliminary airworthiness evaluation of a National Aeronautics and Space Administration automated stall warning system for an OV-1 aircraft
[AD-A152010] N85-26708

ARMY COMMAND AND GENERAL STAFF COLL., FORT LEAVENWORTH, KANSAS.
Computer assisted flight schedule optimization
[AD-A151689] N85-27623

ARMY CONSTRUCTION ENGINEERING RESEARCH LAB., CHAMPAIGN, ILL.
Design of computer-related workstations in relation to job functions and productivity
[AD-A151938] N85-27534

ARMY INDUSTRIAL BASE ENGINEERING ACTIVITY, ROCK ISLAND, ILL.
Manufacturing methods and technology CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) related efforts (FY 1980 - 1986)
[AD-A151817] N85-27547

ARMY MISSILE COMMAND, REDSTONE ARSENAL, ALA.
UTM (Universal Transverse Mercator) determinations from geographical data
[AD-A152293] N85-27610

ARMY RESEARCH AND TECHNOLOGY LABS., CLEVELAND, OHIO.
Multiaxial and thermomechanical fatigue considerations in damage tolerant design
[NASA-TM-87022] N85-26964

ARMY RESEARCH AND TECHNOLOGY LABS., MOFFETT FIELD, CALIF.
Finite-difference computations of rotor loads
[NASA-TM-86682] N85-26669
Piloted simulation of one-on-one helicopter air combat at NOE flight levels
[NASA-TM-86686] N85-26720
Nonlinear equations for dynamics of pretwisted beams undergoing small strains and large rotations
[NASA-TP-2470] N85-27258

ARMY RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS.
Evaluation of a field expedient technique for sweat sample collection
[AD-A151916] N85-27521
Comparative anaerobic power of males and females
[AD-A151960] N85-27523
Effects of dehydration or cold exposure and restricted fluid intake upon cognitive performance
[AD-A151973] N85-27525

ASTRO RESEARCH CORP., CARPINTERIA, CALIF.
A study of structural concepts for ultralightweight spacecraft
[NASA-CR-175765] N85-26848

ATMOSPHERIC AND ENVIRONMENTAL RESEARCH, INC., CAMBRIDGE, MASS.
Cometary atmospheres: Modeling the spatial distribution of observed neutral radicals
[NASA-CR-175852] N85-27781

ATMOSPHERICS, INC., FRESNO, CALIF.
SCPP (Sierra Cooperative Pilot Project) data collection and analysis. Volume 1: Executive summary
[PB85-156065] N85-27494

AUBURN UNIV., ALA.
Measurement of damping of graphite epoxy materials
[NASA-CR-175793] N85-26925
Stress analysis of the space telescope focal plane structure joint
[NASA-CR-175797] N85-27284

AURORA ASSOCIATES, INC., WASHINGTON, D.C.
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762

AUSTRALIAN NATIONAL UNIV., CANBERRA.
Stability of functionals determined by moment conditions
[TRITA-NA-8310] N85-27585
H-sets, convex programming and constrained approximation
[TRITA-NA-8308] N85-27587

AVIONS MARCEL DASSAULT-BREGUET AVIATION, SAINT-CLOUD (FRANCE).
Interactive design of specifications for airborne software set (GISELE) N85-26753

AXIOMATIX, LOS ANGELES, CALIF.
Space Shuttle program communication and tracking systems interface analysis
[NASA-CR-171862] N85-26841

B

BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
Design of a Mobile Combustion Diagnostic Fixture (MCDF)
[AD-A151814] N85-26941
The overall reaction concept in premixed, laminar, steady-state flames. 2: Initial temperatures and pressures
[AD-A152132] N85-26944
Fiber reinforcement of gun propellant
[AD-A152296] N85-27014
Detonation velocity measurements of the explosives Detasheet C and Amatol
[AD-A152298] N85-27015
A review of safety practices and safety training for the explosives field
[AD-A152295] N85-27028
Numerical resolution calculation for elastic-plastic impact problems
[AD-A152292] N85-27270

BATTELLE COLUMBUS LABS., OHIO.
Sixth DOE Electrochemical Contractor's Review. Extended abstracts
[DE84-013679] N85-27151

BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.
Sixth DOE Electrochemical Contractor's Review. Extended abstracts
[DE84-013679] N85-27151

BENDIX AEROSPACE SYSTEMS DIV., MISHAWAKA, IND.
Hardware test program for evaluation of baseline range-range rate sensor concept
[NASA-CR-175794] N85-27183

BENDIX CORP., KANSAS CITY, MO.
Pulsed electrodeposition
[DE85-007057] N85-26950
Measurement capabilities of the Bendix Metrology Organization
[DE85-005795] N85-27029
Bond test data acquisition and analysis system
[DE85-007021] N85-27158

BERKELEY SCIENTIFIC TRANSLATION SERVICE, CALIF.
Internal step-up type higher harmonic light generating device
[DE85-007026] N85-27213

BODENSEEWERK GERAETETECHNIK G.M.B.H., UEBERLINGEN (WEST GERMANY).
Simulation: A tool for cost-effective systems design and live test reduction N85-26657
A description of the process of elaborating man-machine dialog in an aircraft equipped with cathode tubes: Rules and specifications of piloted simulation methods N85-26658

BOEING AEROSPACE CO., SEATTLE, WASH.
Automatic flight control modes for the AFTI/F-111 mission adaptive wing aircraft N85-26756

BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
Research in knowledge representation for natural language understanding
[AD-A152260] N85-27579

BONN UNIV. (WEST GERMANY).
The Faraday rotation experiment N85-27805

BRIGHAM YOUNG UNIV., PROVO, UTAH.
A general purpose scatter storage subsystem and a comparison of hashing methods
[NASA-CR-175814] N85-27542
A fast hidden line algorithm with contour option
[NASA-CR-175803] N85-27582

BRITISH AEROSPACE AIRCRAFT GROUP, BROUGH (ENGLAND).
A modular dissimilar redundant computer designed for high integrity control N85-26751
BRITISH AEROSPACE AIRCRAFT GROUP, PRESTON (ENGLAND).
An update on experience on the fly by wire Jaguar equipped with a full-time digital flight control system N85-26740
BRITISH AEROSPACE PUBLIC LTD. CO., BROUGH (ENGLAND).
ACT flight research experience N85-26741
BRITISH AEROSPACE PUBLIC LTD. CO., PRESTON (ENGLAND).
A method of estimating aircraft attitude from fly by wire flight control system data N85-26653
BRITISH GAS CORP., LONDON (ENGLAND).
Solid state bonding of molybdenum and TZM [BLL-T6439/BG/LRS/LRST751/85] N85-27220
Special features of the temperature dependence of the capillary constant in the vicinity of the critical point [BLL-T6438/BG/LRS/LRST750/85] N85-27632
BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Determination of permissible heating rate of metal [BLL-M-36107-(5828.4)] N85-26957
Ductility equation for porous metals and its linearization [BLL-M-36118-(5828.4)] N85-26958
Dissolution of solid solutions in absence of internal mass transfer [BLL-M-36092-(5828.4)] N85-26959
Structural inhomogeneities in amorphous nickel-phosphorus alloy [BLL-M-36103-(5828.4)] N85-26960
Underwater pipeline: Welding by high frequency induction [BLL-WI-TRANS-662-(9312.57)] N85-27221
Special features of the one-sided automatic welding of structures of Al-Mg alloys N85-27222
Hazards in welding due to oxygen changes in the workplace atmosphere [BLL-WI-TRANSL-684-(9312.57)] N85-27224
Sources of improvement in quality of contact butt welding of wire [BLL-M-36085-(5828.4)] N85-27225
Extreme evaluation of reliability indices for components of metallurgical equipment [BLL-M-36070-(5828.4)] N85-27234
Magnetic method of inspecting mechanical properties of general purpose tubes [BLL-M-36084-(5828.4)] N85-27235
Principles of wave formation along web of H-beams [BLL-M-36041-(5828.4)] N85-27253
Full statistical characteristics of microdeformation [BLL-M-36076-(5828.4)] N85-27254
Monitoring of turbo-machines by shaft vibration measurement [BLL-TRANS-7900-(9022.09)] N85-27255
Quasi-steady vibrations of a rotating shaft grazing an obstacle: Spiral vibration [BLL-CE-TRANS-7962-(9022.09)] N85-27256
Corrective-predictive systems [BLL-M-36063-(5828.4)] N85-27573
Algorithms for determining the relative complexity of dynamic signals [BLL-M-36111-(5828.4)] N85-27574
BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Characteristics of polyacrylic acid-complexed zinc phosphate conversion films deposited on metal surfaces [DE85-004057] N85-26974
Hydrogen induced crack growth in Grade-12 Titanium [BNL-NUREG-35586] N85-26976
Measurement of NSLS distributed diode sputter ion pump characteristics [DE85-006550] N85-27031
Operational test results of a prototype superconducting power transmission system and their extrapolation to the performance of a large system [DE85-006731] N85-27153
A 1-2 GeV/c beam line for hypernuclear and kaon research [DE85-007623] N85-27659
High efficiency ionizer using a hollow cathode discharge plasma [DE85-006690] N85-27693
Scientific data bases on a VAX-11/780 running VMS [DE85-007925] N85-27760
BUNDESGESUNDHEITSAMT, NEUHERBERG (WEST GERMANY).
Evaluation of human exposures to low frequency fields N85-27135
BUREAU OF LAND MANAGEMENT, ANCHORAGE, ALASKA.
Glossary of landscape and vegetation ecology for Alaska [PB85-153831] N85-27372

C

CALIFORNIA INST. OF TECH., PASADENA.
Free-surface phenomena under low- and zero-gravity conditions [NASA-CR-175835] N85-27168
Evaluation of chemical reaction mechanisms for photochemical smog. Part 2: Quantitative evaluation of the mechanisms, revised [PB85-168080] N85-27408
Thermal and magnetic properties of neutron stars N85-27774
CALIFORNIA STATE UNIV., NORTHRIDGE.
Inversion of Rayleigh wave group velocities from high-explosive tests [AD-A152172] N85-27175
CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
LDA study of non-steady flame propagation in a constant volume duct [DE85-007233] N85-26948
On the feasibility of Ab Initio calculations of ordering alloy phase diagrams [DE85-007073] N85-26979
Models of long-period superstructure [DE85-007659] N85-26981
Cryostat and electronic development associated with multi-detector spectrometer systems [DE85-007624] N85-27203
Incorporation of an elliptical boundary condition into the program POISSON [DE85-006820] N85-27564
Overview of the physics issues at the SSC [DE85-007074] N85-27634
Microscopic analysis of angular momentum projected HFB-states in terms of interacting bosons [DE85-007629] N85-27661
TEM investigation of polar-on-nonpolar epitaxy: GaAs-AlGaAs on (100) Ge [DE85-007613] N85-27714
Data management issues of statistical databases [DE85-007616] N85-27763
CALIFORNIA UNIV., DAVIS.
A study of mode-locked argon ion-dye laser systems N85-27205
CALIFORNIA UNIV., IRVINE.
Transformation of nitrogen oxides while sampling combustion products [AD-A152184] N85-26945
CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Bound and free moisture studies of solid materials by FTNMR [DE85-003227] N85-26952
In situ microwave measurements of dielectric properties and moisture in materials [DE85-003622] N85-26953
Empirical development of ground acceleration, velocity and displacement for accidental explosions at J5 or the proposed large altitude rocket cell at Arnold Engineering Development Center [DE85-006324] N85-27020
Signal processing for the analysis of transient electromagnetic data [DE85-007244] N85-27125
Internal step-up type higher harmonic light generating device [DE85-007026] N85-27213
Device for preventing intrusion of a blade during vibration cutting of intermittent cutting with a lathe N85-27232
Hopkinson bar simulation using DYNA2D [DE85-006766] N85-27275
Intercomparison of Radiation Codes in Climate Models (ICRCCM) [DE85-007251] N85-27487
Parallel computation of multiple-scale problems [DE85-007230] N85-27563
Internation information networks for material properties: Revision 1 [DE85-007412] N85-27572
Transverse periodic boundary conditions in molecular dynamics with uniaxial strain shock waves [DE85-006497] N85-27656
Hydrogen vibrational population distributions and negative ion generation in tandem high-density hydrogen discharges [DE85-006764] N85-27657

LIGHT: A ray tracing code to simulate light collection in scintillation spectrometers and light pipes [DE85-007213] N85-27673
Computational plasma physics and supercomputers, revision 1 [DE85-007228] N85-27687
Software for reflectivity calculations of X-ray mirrors, revision 1 [DE85-006842] N85-27688
Kinetic theory and simulation of multi-species plasmas in Tokamaks excited with ICRF microwaves [DE85-006119] N85-27691
CALIFORNIA UNIV., LOS ANGELES.
A study of topologies and protocols for fiber optic local area network [NASA-CR-175771] N85-27669
CANSAS INTERNATIONAL CORP. (PROPRIETARY) LTD. (SOUTH AFRICA).
The development and application of volume scan and cell tracking capabilities for the analysis of convective cloud systems N85-27451
CAPE TOWN UNIV., RONDEBOSCH (SOUTH AFRICA).
The sea level response to weather along the coast of southern Africa N85-27446
Effect of traffic and meteorology on air pollution N85-27452
Atmospherically forced, coastally trapped, long period gravity waves off the south coast of southern Africa N85-27461
CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Solution of Onsager's equation for a rotating compressible fluid in a multiply-connected domain [DE85-007048] N85-27178
CENTRAL ELECTRICITY GENERATING BOARD, LONDON (ENGLAND).
Method of investigating accumulations of damage to weld joints in the case of low-cycle creep [BLL-CE-TRANS-8088-(9022.09)] N85-27219
Does a 50-cycle alternating field have central nervous effects? [BLL-CE-TRANS-8083-(9022.09)] N85-27507
CENTRE D'ESSAIS AERONAUTIQUE TOULOUSE (FRANCE).
Guide for the execution of reliability tests in the laboratory N85-27237
CENTRE D'ETUDES ET DE RECHERCHES, TOULOUSE (FRANCE).
Active control technology: Past, present, future N85-26731
Study on a prismatic dye vat [CERT-2/6124-04-RO] N85-27217
Lidar ER2 (ozone). Crystal characterization for harmonic conversion [CERT-2/6129-00] N85-27717
CENTRE NATIONAL D'ETUDES SPATIALES, TOULOUSE (FRANCE).
Simulation of a low orbit restitution. Covariance analysis of the position-velocity by Doppler and accelerometer measurements [CNES-CT/DTI/MS/AE/166] N85-26836
DORIS: Prediction in Doppler measurement [CNES-CT/DTI/MS/AE/170] N85-26843
Characterization of solderless minimrapping connections [CNES-NT-112] N85-27238
Data Collection and Platform Location by Satellite: ARGOS Users' Conference N85-27333
Studies into location accuracy N85-27334
Location and data collection satellite system ARGOS. User's guide N85-27371
CENTRE NATIONAL POUR L'EXPLOITATION DES OCEANS, BREST (FRANCE).
Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic N85-27355
CENTRE NATIONAL POUR L'EXPLOITATION DES OCEANS, PARIS (FRANCE).
Wave directional spectra via ARGOS N85-27343
CHRISTIAN MICHELSENS INSTITUTT FOR VIDENSKAP OG ANDSFRIHET, BERGEN (NORWAY).
Monitoring of marine environment N85-27341
CLEMSON UNIV., S.C.
Study of acceptance criteria for joint densities in bituminous airport pavements [FAA-PM-85-5] N85-26761
Photovoltaic cell reliability research: Investigation of accelerated stress factors and failure-degradation mechanisms in terrestrial solar cells [NASA-CR-175815] N85-27388
COLOGNE UNIV. (WEST GERMANY).
Results of the magnetic field experiments E2 and E4 onboard Helios 1 and Helios 2 N85-27799
COLORADO SCHOOL OF MINES, GOLDEN.
Born inversion with a stratified reference velocity [AD-A149222] N85-27594

COLORADO STATE UNIV., FORT COLLINS.
Forecast of Atlantic seasonal hurricane activity for 1985 N85-27470
COLORADO UNIV., BOULDER.
The problem of atmospheric turbulence [NASA-CR-175783] N85-27464
Parallel computing in optimization [AD-A151812] N85-27568
COLUMBIA UNIV., NEW YORK.
Synthesis of phenols from metal-carbynes and diynes [AD-A151913] N85-26997
COMMITTEE ON APPROPRIATIONS (U. S. HOUSE).
Department of Housing and Urban Development-independent agencies appropriations for 1986. Part 6: National Aeronautics and Space Administration [GPO-47-235] N85-27768
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
Recent failures of weather satellites [S-HRG-98-1070] N85-26855
Soviet space programs, 1976-1980 (with supplementary data through 1983). Part 3: Unmanned space activities [S-PRT-98-23S-PT-3] N85-27765
COMMITTEE ON ENERGY AND COMMERCE (U. S. HOUSE).
National Telecommunications and Information Administration authorization [GPO-38-660] N85-27766
COMMITTEE ON FOREIGN RELATIONS (U. S. SENATE).
East-West cooperation in outer space [S-HRG-98-1064] N85-27767
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION (U. S. HOUSE).
The impact of weather on aviation safety [GPO-95-520] N85-26685
COMPUTER SCIENCES CORP., SILVER SPRING, MD.
Flight Experiment Demonstration System (FEDS) functional description and interface document [NASA-CR-175290] N85-26769
CONNECTICUT UNIV., STORRS.
Modeling the role of radicals in the ignition of and flame propagation in hydrogen-air and methane-air mixtures N85-26935
Iron rich low cost superalloys [NASA-CR-174900] N85-26962
Elevated temperature biaxial fatigue [NASA-CR-175795] N85-27263
CONTINENTAL SHELF INST., TRONDHEIM (NORWAY).
Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance N85-27344
CONTINUUM, INC., HUNTSVILLE, ALA.
Simulation of solidification in a Bridgman cell [NASA-CR-175836] N85-27705
CONTROL DYNAMICS CO., HUNTSVILLE, ALA.
Effects of bearing deadbands on bearing loads and rotor stability N85-26889
CORNELL UNIV., ITHACA, N.Y.
Studies related to the deep Earth gas: 1983 [PB85-171114] N85-27373
Molecular spectroscopy from the Kuiper Airborne Observatory [NASA-CR-175748] N85-27783
CORNELL UNIV., NEW YORK, N.Y.
A study of Ga(.47)In(.53)As and Al(.48)In(.52)As for very high frequency device applications [AD-A151995] N85-27706

D

DANISH METEOROLOGICAL INST., COPENHAGEN.
Operational experiences with the ARGOS system in Greenland N85-27353
DAYTON UNIV., OHIO.
Turbine blade friction damping study N85-26886
DEFENCE RESEARCH ESTABLISHMENT, OTTAWA. (ONTARIO).
Investigation of the requirement for auxiliary heating of Canadian forces personnel [AD-A151950] N85-27522
DELAWARE UNIV., NEWARK.
Polycrystalline semiconductor heterojunction modelling (CdS/CuInSe(sub)2) [DE85-002913] N85-27713
DEPARTMENT OF DEFENSE, WASHINGTON, D. C.
DoD manual for standard data elements, part 1 [AD-A152201] N85-27754
DoD manual for standard data elements, part 2 [AD-A152202] N85-27755
DoD manual for standard data elements, part 3 [AD-A152203] N85-27756
DoD manual for standard data elements, part 4 [AD-A152204] N85-27757
DoD manual for standard data elements, part 5 [AD-A152205] N85-27758
DEPARTMENT OF ENERGY, OAK RIDGE, TENN.
Energy data base: Subject thesaurus [DE84-010586] N85-27761
DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Wind energy technology program summary [DE85-007349] N85-27392
DEPARTMENT OF THE ARMY, WASHINGTON, D. C.
Suppression of vibration effects on piezoelectric crystal resonators [AD-D011625] N85-27142
Acceleration resistant combination of opposite-handed piezoelectric crystals [AD-D011626] N85-27143
Acceleration-resistant crystal resonator [AD-D011627] N85-27144
Method of fabricating acceleration resistant crystal resonators and acceleration resistant crystal resonators so formed [AD-D011630] N85-27145
Acceleration sensitivity reduction method [AD-D011631] N85-27146
DEPARTMENT OF THE NAVY, WASHINGTON, D. C.
Torso restraint system [AD-D011609] N85-26684
Fluorinated polyesters [AD-D011611] N85-26988
Solid state hydrogen pumping and storage material [AD-D011610] N85-27011
Interference suppressor for radar MTI [AD-D011606] N85-27086
Optical non-line-of-sight covert, secure high data communication system [AD-D011607] N85-27087
Switching mixer [AD-D011602] N85-27139
Wavelength multiplexer-demultiplexer [AD-D011608] N85-27140
Optically triggered transferred-electron device microwave burst and single pulse generators [AD-D011614] N85-27141
Phase-lock fiber optic interferometer [AD-D011603] N85-27191
Polarimetric image recorder [AD-D011605] N85-27192
Dual electrochemical system [AD-D011616] N85-27376
Dual species ion implantation of ternary compounds based on In-Ga-As [AD-D011617] N85-27698
DEPARTMENT OF TRANSPORT, PRETORIA (SOUTH AFRICA).
Data from BOC-yachts: A significant input to Southern Hemisphere analysis N85-27356
DETROIT DIESEL ALLISON, INDIANAPOLIS, IND.
Analytical fuel property effects--small combustors [NASA-CR-174738] N85-26709
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).
Wind modelling for increased aircraft operational efficiency N85-26952
Aspects of application of ACT systems for pilot workload alleviation N85-26734
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).
Ten years of Helios [ISBN-3-88135-156-6] N85-27794
Helios ground operations N85-27811
DORNIER-WERKE G.M.B.H., MUNICH (WEST GERMANY).
OLGA: An open loop gust alleviation N85-26744
DOUGLAS AIRCRAFT CO., INC., LONG BEACH, CALIF.
Probabilistic computer model of optimal runway turnoffs [NASA-CR-172549] N85-26760
DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.
A robotic system for preparing reagent and dilution vials [DE85-008262] N85-27231
DUKE UNIV., DURHAM, N. C.
A comprehensive strategy for saturation decompression with nitrogen-oxygen [AD-A151800] N85-27520
DUNDEE UNIV. (SCOTLAND).
The validation of sea surface temperatures determined from AVHRR data using in situ data recovered via system ARGOS N85-27342

E

EATON CORP., SOUTHFIELD, MICH.
AC powertrain for an electric vehicle, phase 2 and phase 3 [NASA-CR-175760] N85-27771
EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
INEL electric vehicle laboratory qualification: Transition test results and comparisons with JPL ETV1-2 data [DE85-008006] N85-27772
ELECTRICITY COUNCIL, LONDON (ENGLAND).
The use of heat pumps in district heat supply [BLL-OA-TRANS-2728-(6198.3)] N85-27163
ELECTRONIC TECHNIQUES, INC., FORT COLLINS, COLO.
SCPP (Sierra Cooperative Pilot Project) Forecasting Support N85-27493
ELORET CORP., SUNNYVALE, CALIF.
Simulation studies for surfaces and materials strength [NASA-CR-175766] N85-27262
EMMANUEL COLL., BOSTON, MASS.
A study of the generation mechanisms of high latitude and equatorial F-region irregularities using DE-2 data [NASA-CR-175745] N85-27423
ENTECH CORP., DALLAS-FORT WORTH AIRPORT, TEX.
Design and development of a linear Fresnel lens air-cooled photovoltaic module and a stand-alone photovoltaic collector array [DE85-006854] N85-27391
ENVIRONMENTAL PROTECTION AGENCY, CINCINNATI, OHIO.
Forward library searching of previously-quantitated peaks, using a scan list created from a quantitation list by a novel FORTRAN program for the INCOS data system [PB85-165635] N85-27541
ENVIRONMENTAL PROTECTION AGENCY, CORVALLIS, OREG.
Impact of ozone on vegetation [PB85-159937] N85-27403
ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
Review of national emission standards for mercury [PB85-153906] N85-27406
ENVIRONMENTAL SCIENCES RESEARCH LAB., RESEARCH TRIANGLE PARK, N.C.
Emission inventory applications to regional acid deposition modeling [PB85-157386] N85-27033
ESCOM, CLEVELAND (SOUTH AFRICA).
Acid rain: Towards automated monitoring N85-27444
EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION, BRUSSELLS (BELGIUM).
A cost-efficient control procedure for the benefit of all airspace users N85-26851
EUROPEAN SPACE AGENCY, PARIS (FRANCE).
European space science horizon 2000 [ESA-SP-1070] N85-26771
EUROPEAN SPACE AGENCY. EUROPEAN SPACE OPERATIONS CENTER, DARMSTADT (WEST GERMANY).
Helios project support N85-27812
EXXON RESEARCH AND ENGINEERING CO., LINDEN, N.J.
Jet fuel property changes and their effect on producibility and cost in the U.S., Canada, and Europe [NASA-CR-174840] N85-27012

F

FAILURE ANALYSIS ASSOCIATES, PALO ALTO, CALIF.
A review of fracture mechanics life technology N85-26863
FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
National Airspace System Plan: Facilities, equipment and associated development N85-26692
FEDERAL GEODETIC CONTROL COMMITTEE, WASHINGTON, D.C.
Standards and specifications for geodetic control networks [PB85-168478] N85-27374
FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, BETHESDA, MD.
Research opportunities in loss of red blood cell mass in space flight [NASA-CR-175808] N85-27517
FERMI NATIONAL ACCELERATOR LAB., BATAVIA, ILL.
Distortion functions [DE85-007511] N85-27655

FERRANTI DEFENCE SYSTEMS LTD., EDINBURGH (SCOTLAND).
Low cost two gimbal inertial platform and its system integration N85-26661
FINNISH METEOROLOGICAL INST., HELSINKI.
Evaluation of the area and severity of last night's frosts
[REPT-109] N85-27473
FLORIDA STATE UNIV. SYSTEM, GAINESVILLE.
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405
FLORIDA UNIV., GAINESVILLE.
Identification and properties of molecular systems of potential use in solar-pumped lasers
[NASA-CR-175804] N85-27207
Heavy doping effects in high efficiency silicon solar cells
[NASA-CR-175779] N85-27383
FORD AEROSPACE AND COMMUNICATIONS CORP., PALO ALTO, CALIF.
Spacecraft configuration study for second generation mobile satellite system
[NASA-CR-175774] N85-26849
FOREIGN RESOURCES ASSOCIATES, FORT COLLINS, COLO.
Ca-Ga, Sr-Ga and Ba-Ga binary systems
[DE85-006454] N85-26980
FUJI HEAVY INDUSTRIES LTD., UTSUNOMIYA (JAPAN).
Comparison of computational results of a few representative three-dimensional transonic potential flow analysis programs N85-26628
FUJITSU LTD., TOKYO (JAPAN).
Recent trends in software technology for vector processors N85-26615

G

GENERAL DYNAMICS CORP., FORT WORTH, TEX.
Application of AFTI/F-16 task-tailored control modes in advanced multirole fighters N85-26735
GENERAL DYNAMICS/FORT WORTH, TEX.
Initial quality of advanced joining concepts
[AD-A152241] N85-27027
GENERAL ELECTRIC CO., BINGHAMTON, N.Y.
The state-of-the-art and future of flight control systems N85-26732
GENERAL ELECTRIC CO., CINCINNATI, OHIO.
Development of a rotor wake-vortex model, volume 1
[NASA-CR-174849] N85-26668
Effects of surface chemistry on hot corrosion life
[NASA-CR-174915] N85-26711
Component-specific modeling
[NASA-CR-174765] N85-27261
GENERAL ELECTRIC CO., LARGO, FLA.
Robotic thermal battery pellet fabrication
[DE85-007755] N85-27154
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Parametric study of potential early commercial power plants Task 3-A MHD cost analysis
[NASA-CR-175839] N85-27377
GEOLOGICAL SURVEY, DENVER, COLO.
Preliminary assessment of climatic change during late Wisconsin time, southwest Great Basin and vicinity, Arizona, California and Nevada
[DE85-008343] N85-27488
GEORGE WASHINGTON UNIV., WASHINGTON, D.C.
Determination of failure characteristics of materials and structures
[AD-A152073] N85-27266
Formulas for updating the generalized inverse of a symmetric matrix perturbed by a symmetric rank 2 matrix composed of 2 nonsymmetric DYADS
[AD-A151736] N85-27629
GEORGIA INST. OF TECH., ATLANTA.
A study of computational techniques for noncanonical microstrip antennas and arrays
[AD-A152216] N85-27123
An investigation of tropospheric ions N85-27412
A decomposition procedure for convex quadratic programs
[AD-A151732] N85-27595
GRENOBLE UNIV. (FRANCE).
A seismic ARGOS data collection platform N85-27350
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 2. Program compilation
[AD-A152271] N85-26703
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 1: User's manual
[AD-A152268] N85-26725
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 2: Final report on program enhancement and delivery
[AD-A152269] N85-26726
ESP (External-Stores Program): A pilot computer program for determining flutter-critical external-store configurations. Volume 3, part 1: Program compilation
[AD-A152270] N85-26727
X-29A digital flight control system design N85-26736
GULF RESEARCH AND DEVELOPMENT CO., PITTSBURGH, PA.
Low pressure storage of methane on interlayered clays for potential vehicular applications
[DE85-006949] N85-27017

H

HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
Swelling behavior of titanium-modified AISI 316 alloys
[DE85-007470] N85-26982
HARVARD UNIV., CAMBRIDGE, MASS.
Measurement of elements in the stratosphere
[NASA-CR-175891] N85-27414
Free radicals in the stratosphere: A new observational technique N85-27415
Stratospheric ClO: In-situ detection with a new approach N85-27416
The copper vapor laser N85-27417
Research and development of new instruments N85-27418
In-situ stratospheric ozone measurements: Recent results and their implications N85-27419
Water vapor N85-27420
Role and fate of ozone in the atmosphere N85-27421
Parallel time 0(log N) acceptance of deterministic CFLs
[AD-A152255] N85-27539
Efficient parallel pseudo-random number generation
[AD-A152235] N85-27608
Probabilistic algorithms in group theory
[AD-A152253] N85-27630
Spin-polarized quantum systems
[DE85-006914] N85-27667
HAWAII UNIV., HONOLULU.
Effects of temperature on remotely sensed mafic mineral absorption features N85-27323
HEALTH EFFECTS RESEARCH LAB., RESEARCH TRIANGLE PARK, N. C.
Experiments in microwave exposure in the rat: Body temperature, serum chemistry and the use of chemical restraint
[PB85-156834] N85-27512
Biological influences of low-frequency sinusoidal electromagnetic signals alone and superimposed on RF carrier waves
[PB85-161248] N85-27527
HELSINKI UNIV. OF TECHNOLOGY, ESPOO (FINLAND).
Analysis of the convergence of mixed finite element methods
[HTKK-MAT-A227] N85-27613
HICKLING (JAMES F.) MANAGEMENT CONSULTANTS LTD., OTTAWA (ONTARIO).
Central solar heating plants with seasonal storage. Evaluation of systems concepts based on heat storage in aquifers
[DE85-006788] N85-27396
HITACHI LTD., TOKYO (JAPAN).
Recent advances in supercomputers N85-26625
HOFFMAN (F. E.) AND ASSOCIATES, MONTROSE, CALIF.
Cost prediction model for various payloads and instruments for the Space Shuttle Orbiter
[NASA-CR-175781] N85-26842
HONEYWELL, INC., MINNEAPOLIS, MINN.
An advanced solid state pressure transducer for high reliability SSME application N85-26905
HUNTER COLL., NEW YORK.
Ion and polymer chain motion in a superionic sodium-poly(ethylene oxide) complex
[AD-A152290] N85-27001

I

IAP RESEARCH, INC., DAYTON, OHIO.
Advanced energy storage systems
[AD-A152244] N85-26915
ILLINOIS DEPT. OF ENERGY AND NATURAL RESOURCES, SPRINGFIELD.
Current alternative energy research and development in Illinois
[PB85-163137] N85-27397
ILLINOIS UNIV., CHICAGO.
Studies of collisional and nonlinear radiative process for development of coherent UV and XUV sources
[AD-A152001] N85-27670
An adaptive technique and its application in database design N85-27748
ILLINOIS UNIV., URBANA.
An experimental investigation of two-dimensional flame-vortex interactions N85-26934
Analysis of deflagration to detonation transition in high-energy solid propellants N85-27010
An experimental study of compressible turbulent reattaching free shear layers N85-27161
Fatigue damage and small crack growth during biaxial loading N85-27247
On residual stress in an elastic body N85-27248
Remote sensing of irregularities in the equatorial ionosphere using the radio scintillation technique N85-27317
Mapping principles for the standards interface for computer aided design
[PB85-177905] N85-27566
ILLINOIS UNIV., URBANA-CHAMPAIGN.
Rotor blade flap-lag stability and response in forward flight in turbulent flows N85-26698
Scattering center analysis for radar cross section modification N85-27065
Creep-fatigue interaction of notched 304 stainless steel bars N85-27249
Response of a wind turbine blade to seismic and turbulent wind excitations N85-27375
TEM investigation of polar-on-nonpolar epitaxy: GaAs-AlGaAs on (100) Ge
[DE85-007613] N85-27714
Retrieval performance in a full text journal article database N85-27747
Access path optimization for network database retrieval N85-27749
Design of an interface to an information retrieval network N85-27750
A numerical study of nonspherical black hole accretion N85-27780
INSTITUT FRANCO-ALLEMAND DE RECHERCHES, ST. LOUIS (FRANCE).
Piezoelectric and pyroelectric polymers N85-27006
Generation of detonation waves of given spatial and temporal characteristics
[ISL-R-103/83] N85-27021
Influence of behavior laws in the explosive deformation of metal plates
[ISL-R-122/83] N85-27032
Measurements of two-phase exhaust flow parameters of a small caliber gun associated with muzzle flash phenomena
[ISL-CO-212/83] N85-27182
Simulation of interior ballistics flows in a shock tube
[ISL-CO-222/83] N85-27183
Study of the coupling between average, coherent and turbulent fields in a circular excited free jet
[ISL-R-115/83] N85-27184
Computation model of turbulent free flow: Application to axisymmetric jets
[ISL-R-126/83] N85-27185
The utilization of optical fibers in holography
[ISL-R-102/83] N85-27196
Ultrafast holography using optical fibers
[ISL-CO-238/83] N85-27204
The development of onboard laser velocimeter at the Saint Louis Institute (France) from 1976 to 1982
[ISL-NB-402/83] N85-27216
A method for the evaluation of the residual energy of a metallic fragment after perforation of a thin target
[ISL-R-113/83] N85-27233
Feasibility study on Laser Doppler Anemometer (LDA) wind velocity measurements using pulsed visible laser light
[ISL-CO-224/83] N85-27489
An automatic traversing system for Laser Doppler Anemometer (LDA) applications to wind tunnels and to free jets
[ISL-CO-225/83] N85-27490
Measurement of cochlear acoustic pressure in guinea pigs
[ISL-CO-234/83] N85-27644
Contribution to the study of equivalent noise source identification in fast cold jets
[ISL-R-114/83] N85-27645
Analyses of orderly structures in jets and the relationship with emitted noise
[ISL-R-117/83] N85-27646

Formulation of a coherent light-sheet by means of a cylindrical-spherical optical system
[ISL-R-116/83] N85-27674

INSTITUT FUER ANGEWANDTE GEODAESIE, FRANKFURT AM MAIN (WEST GERMANY).
Reports on cartography and geodesy. Series 1: Original reports, no. 94
[ISSN-0469-4236] N85-27357
Use of vector processors in cartographic raster data processing, with special regard to the AP-120B vector processor N85-27358
Testing of scanner-assisted revision of the topographic map 1:25,000 (TK 25) N85-27359
Realization of cartographic tasks on the multiprocessor system EGPA N85-27360
Application of the Siemans Computer Aided Computer (Sicad) system to the surveying management in Baden-Wuerttemberg N85-27361
Automatic engraving of map frames in the revision of the TK 25, 1:25,000 topographical map N85-27362
Application of interactive graphic systems in land consolidation. Processing of planning maps N85-27363
A concept for map updating using digital image processing methods N85-27364
Raster or vector processing. Experience with the application of programs for the construction of thematic maps with boundary design in the Lower Saxony (West Germany) Land Administration for ground research N85-27365
Status of computer aided mapping in hydrographic services N85-27366
Contour line generalization using digital image processing methods N85-27367
What does digital image processing perform in the production of orthophotomaps N85-27368

INSTITUTE OF OCEANOGRAPHIC SCIENCES, WORMLEY (ENGLAND).
Results of an initial trial of a satellite telemetering buoy measuring near surface current N85-27345

INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
Proposed energy systems for the Brazilian data collection satellite
[INPE-3393-PRE/664] N85-26856
Radar return from vegetation covered terrains
[INPE-3470-PRE/713] N85-27093
INPE's line imaging camera: Preliminary results
[INPE-3476-PRE/719] N85-27194
The Bressex multispectral camera: Preliminary characteristics
[INPE-3424-PRE/687] N85-27195
CNPq/INPE LANDSAT system: Report of activities from October 1, 1983 to September 30, 1984
[E85-10097] N85-27318
Noise correction on LANDSAT images using a spline-like algorithm
[E85-10098] N85-27319
Study of the urban evolution of Brasilia with the use of LANDSAT data
[E85-10101] N85-27321
Development of a graphic system: Example using the outline of synoptic charts
[INPE-3296-PRE/611] N85-27327
SELPER (Latin American Society of Remote Sensory Specialists)
[INPE-3315-PRE/622] N85-27328
Function of remote sensing in Brazil
[INPE-3314-PRE/621] N85-27329
Diffusion coefficients for coastal water determined from aerial photographs
[INPE-3413-PRE/679] N85-27331
The relevance of remote sensing to Brazil
[INPE-3421-PRE/686] N85-27332
Study of the functions of similarity of the planetary boundary layer. Part 1: Theory
[INPE-3129-PRE/520-PT-1] N85-27426
Study of the functions of similarity of the planetary boundary layer. Part 2: Results
[INPE-3130-PRE/521-VOL-2] N85-27429
Radon concentration inversion in the troposphere: Still unexplained
[INPE-3360-PRE/638] N85-27431
Electric field and energy transfer by magnetopause reconnection
[INPE-3448-PRE/701] N85-27432
Equatorial F-region irregularity latitudinal extension and dynamo electric field
[INPE-3494-PRE/731] N85-27433
Dependence of equatorial F-region plasma bubble rise velocity and dynamo electric field on solar cycle
[INPE-3439-PRE/696] N85-27434
Observations of airglow O2(1-Sigma) atmospheric band at 8645 A and the rotational temperature at 23 deg S
[INPE-3378-PRE/653] N85-27435
Atmospheric radon measurements in the Antarctic Penninsula: A preliminary report
[INPE-3398-PRE/667] N85-27436
X-ray intensification at balloon altitudes of the South Atlantic magnetic anomaly in association with geomagnetic activity
[INPE-3469-PRE/712] N85-27437
A graphic system for drawing synoptic maps by computer
[INPE-3215-PRE/568] N85-27474
SINOGRAFO: A system for influencing and forecasting weather
[INPE-3349-PRE/628] N85-27475
On the 1983 drought in northeast Brazil
[INPE-3412-PRE/678] N85-27476
Tropical Oceans-Global Atmosphere (TOGA) experiment planning for the Brazilian participation in TOGA global climate program
[INPE-3499-PRE/735] N85-27477
An appraisal of the duration of the recent drought in northeast Brazil and a forecast for 1985
[INPE-3477-PRE/720] N85-27478
Thermospheric winds observed by OI6300A Doppler shifts at 23 deg S in the Brazilian sector
[INPE-3384-RPE/470] N85-27479
Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters
[INPE-3492-PRE/729] N85-27504
Diagnostic system
[INPE-3350-PRE/659] N85-27519
Use of REDUCE 2 for symbolic programming
[INPE-3355-PRE/633] N85-27544
An interpolation method with the possibility of first derivative correction
[INPE-3352-PRE/631] N85-27590
Surface interpolation using weighted splines
[INPE-3387-PRE/658] N85-27591
Periodic cluster simulation of a disordered impurity system
[INPE-3453-PRE/705] N85-27628
A portable pulse analyzer for nuclear geophysics using a Sinclair-TK microcomputer
[INPE-3278-PRE/601] N85-27666
Comments on the paper by F. Pegoraro, L. Sugiyama: Spatial diffusion of charged high-energy fusion products by shear Alfven perturbations
[INPE-3291-PRE/606] N85-27675
Shallow impurity cluster states in n-type semiconductors
[INPE-3495-PRE/732] N85-27699
Electronic density of states for the double donor system SiP, As
[INPE-3447-PRE/700] N85-27700
On some physical impurity properties of doped-indirect gap semiconductors at low and intermediate concentrations
[INPE-3452-PRE/704] N85-27701
Density of impurity states associated to inversion layers
[INPE-3406-PRE/675] N85-27702
Optimum convection conditions for Czochralski growth of semiconductors
[INPE-3395-PRE/665] N85-27703
Impurity bands associated with MOS inversion layers
[INPE-3483-PRE/726] N85-27704
Experience of the Institute of Space Research with the use of remote sensing in urban planning studies
[INPE-3159-PRE/533] N85-27770
Acousto-optical spectrometers at Itapetinga Radio Observatory
[INPE-3479-PRE/722] N85-27776
Radio observations of comet P/Crommelin
[INPE-3480-PRE/723] N85-27777
Calibration methods in millimeter-wave radioastronomy
[INPE-3481-PRE/724] N85-27778
A synchrotron/inverse Compton interpretation of a solar burst producing fast pulses at lambda 3 mm and hard X-rays N85-27815
Microwaves and hard X-rays ultrafast time structures at the impulsive phase of solar bursts
[INPE-3478-PRE/721] N85-27816

INSTITUTO DE PESQUISAS ESPACIAIS, SAO PAULO (BRAZIL).
System of interpretation of remote sensing data when hydrocarbons are present, volume 2
[INPE-3067-TDL/162-VOL-2] N85-27326
Symbiosis between postgraduate training and research projects: A successful experience
[INPE-3216-PRE/569] N85-27330
Atmospheric chemistry
[INPE-3190-PRE/554] N85-27430
Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms
[INPE-3359-PRE/637] N85-27545
Study of the degradation of short-circuit current and the open-circuit tension of spatial solar cells as a function of the fluency of 1MeV electrons
[INPE-3356-PRE/634] N85-27814

INTERA ENVIRONMENTAL CONSULTANTS LTD., HOUSTON, TEX.
Report on regional groundwater flow modeling for the Palo Duro Basin, Texas
[DE85-007490] N85-27370

INTERNATIONAL DATA CORP., MCLEAN, VA.
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762

IOWA UNIV., IOWA CITY.
Configuration space Faddeev calculations
[DE85-005813] N85-27721
Plasma waves in the solar wind: Ten years of Helios obeservations N85-27801

ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES CO. LTD., TOKYO (JAPAN).
Numerical analysee in aerodynamic design of aero-engine fan N85-26618

J

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
Studies on the processing methods for extraterrestrial materials
[NASA-CR-175778] N85-26768
Cost prediction model for various payloads and instruments for the Space Shuttle Orbiter
[NASA-CR-175781] N85-26842
A study of structural concepts for ultralightweight spacecraft
[NASA-CR-175765] N85-26848
Development of a persistent chemical agent simulation system
[NASA-CR-175780] N85-26937
Meteorological factors in Earth-Satellite propagation
[NASA-CR-175764] N85-27089
Consultative Committee for Space Data Systems. Panel 1: Support
[NASA-CR-175786] N85-27090
Automated CPX support system preliminary design phase
[NASA-CR-175784] N85-27091
The Telecommunications and Data Acquisition Report
[NASA-CR-175842] N85-27094
Relating the planetary ephemerides and the radio reference frame N85-27095
Photon detection with cooled avalanche photodiodes: Theory and preliminary experimental results N85-27096
Techniques for computing the DFT using the residue Fermat number systems and VLSI N85-27097
Bit error rate of coherent M-ary PSK N85-27098
Synchronizing heavily encoded data in bad weather N85-27099
A software simulation study of a sequential decoder using the Fano algorithm N85-27100
Symbol stream combining in a convolutionally coded system N85-27101
An integrated UNIX-based CAD system for the design and testing of custom VLSI chips N85-27102
High-speed digital baseband mixer N85-27103
Digital filters for digital phase-locked loops N85-27104
Maintenance of time and frequency in the DSN using the global positioning system N85-27105
Network information management subsystem N85-27106
A description of the 64-meter antenna elevation drive gears and their strange wear N85-27107
Repair of the DSS-14 pedestal concrete N85-27108
Determining availability characteristics of DSN data systems using discrepancy report data N85-27109
Conducting a thermal conductivity survey
[NASA-CR-175792] N85-27166
In plane stress analysis
[NASA-CR-175775] N85-27259
Shuttle imaging radar-A (SIR-A) data analysis
[NASA-CR-175785] N85-27324
Manufacturing cost analysis of a parabolic dish concentrator (General Electric design) for solar thermal electric power systems in selected production volumes
[NASA-CR-175772] N85-27360
MOD silver metallization for photovoltaics
[NASA-CR-175773] N85-27361
Flat-plate solar array project process development area: Process research of non-CZ silicon material
[NASA-CR-175777] N85-27362
Heavy doping effects in high efficiency silicon solar cells
[NASA-CR-175779] N85-27363

Documentation and solar cell modules
[NASA-CR-175769] N85-27384
Photovoltaic cell reliability research: Investigation of accelerated stress factors and failure-degradation mechanisms in terrestrial solar cells
[NASA-CR-175815] N85-27388
On the use of a sunward-libration-point orbiting spacecraft as an IMF monitor for magnetospheric studies
[NASA-CR-175809] N85-27426
The problem of atmospheric turbulence
[NASA-CR-175783] N85-27464
Conducting a wind sensing study
[NASA-CR-175782] N85-27465
A modeling analysis program for the JPL table mountain lo sodium cloud
[NASA-CR-175851] N85-27468
Finite elements and the method of conjugate gradients on a concurrent processor
[NASA-CR-175812] N85-27588
A study of topologies and protocols for fiber optic local area network
[NASA-CR-175771] N85-27669
The Faraday rotation experiment N85-27805

JOHNS HOPKINS UNIV., BALTIMORE, MD.

Microstructures and properties of rapidly solidified alloys
[NASA-CR-172377] N85-26961

JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.

USSR report: Space
[JPRS-USP-85-004] N85-26772
Tass reports program for Salyut-7 fully completed N85-26773
Cosmonaut Savitskaya says many women in cosmonaut training N85-26774
Academician Zuyev notes plans for lasers on spacecraft for atmospheric research N85-26775
Satellite research on solar flares N85-26776
Positions of relative equilibrium of satellite-gyrostat N85-26777
Integrable cases of restricted doubly averaged 3-body problem N85-26778
The 6 pi-periodic solutions of plane restricted elliptical 3-body problem in neighborhood of libration points N85-26779
Stability of periodic satellite motions relative to center of mass in circular orbit N85-26780
Optimum rotation of solid body with 1 axis of symmetry N85-26781
Optimum parameters of aerogyroscopic satellite orientation system N85-26782
Method for evaluating perturbation in algorithms for solving navigational problems N85-26783
Statistical regularization methods in problem of navigational determination of space vehicle orbits N85-26784
Observability in problem of correction of inertial navigation systems using additional information from artificial Earth satellite N85-26785
Spectral characteristics of protons at low and high altitudes during geomagnetic storm of 29 July 1977 N85-26786
Experimental research on ionospheric disturbance caused by cumulative barium vapor injection N85-26787
Substorms in energetic radiation belt particles according to data from Meteor artificial Earth satellite N85-26788
Measuring electrical field fluctuations by Langmuir Double Probe Method N85-26789
Modeling plasma mantle of Earth's magnetosphere N85-26790
Periodicity of variations in galactic cosmic ray fluxes and solar activity parameters near 20th cycle minimum N85-26791
Ionization coefficient for atomic collisions in meteor trail N85-26792
Accuracy in predicting orbital motion of artificial Earth satellite N85-26793
Instability of solar wind near streamlined bodies N85-26794
Geophysical responses of dynamics of solar wind transition region N85-26795
Variations in intensity of secondary cosmic radiation observed on 10-11 August 1981 N85-26796
Determining effective rate of plasma heating in outer equatorial ionosphere using data from ISIS-1 and ISIS-2 satellites N85-26797
Influence of tropical F region in ionosphere on propagation of short radio waves N85-26798
Glow of ionospheric F-layer in Line 630 nm determined from photographs taken aboard Salyut-6 orbital station: interpretation of results N85-26799
Measurements of fluxes of high-energy protons and electrons by 2 oppositely oriented spectrometers aboard Cosmos-368 artificial Earth satellite N85-26800
Bursts of relativistic electrons in magnetopause and in outer radiation belt N85-26801
Correlated fluctuations of charged particle fluxes and magnetic field according to data from Intercosmos-10 satellite N85-26802
TASS update on flights of Vega-1 and Vega-2 N85-26803
Kovtunenko discuses Vega Project N85-26804
French and West German equipment for Vega Project N85-26805
Analysis of short-period changes in intensity of hard X-radiation of solar flares registered aboard Venera-13 and Venera-14 spacecraft N85-26806
Mechanism of formation of low temperatures in nighttime Venusian thermosphere N85-26807
Orientation and strength of Martian magnetic dipole N85-26808
Possible configuration of Martian magnetosphere N85-26809
Possible period of Jovian activity and possibility of seasons N85-26810
Research on zero-gravity botany apparatus N85-26811
Structural-functional changes in bacterial cells under spaceflight conditions N85-26812
Space power plants N85-26813
Construction and functioning of extended orbital systems N85-26814
Ion sensor signal fluctuations during operation of spacecraft reaction engines N85-26815
Heliocentric sail problem with variable gravity field reduction N85-26816
Application of space methods in geodesy N85-26817
Technological experiments on high-altitude rockets N85-26818
SVIT complex for analysis of space photography N85-26819
Tenth Conference of Working Group of Socialist Countries on Remote Sensing of Earth under Intercosmos Program N85-26820
Year-to-year variability of components of Earth's radiation budget according to satellite measurement data N85-26821
One approach to remote sensing of total ozone content N85-26822
Scheme for atmospheric thermal sensing from satellites with enhanced vertical resolution N85-26823
Study and mapping of anthropogenic effect on environment in different regions of USSR on basis of space photographs N85-26824
Multiple regression analysis of photographic image of soil properties N85-26825
Identification of structure of soil-vegetation cover using aerial and space photographs N85-26826
Use of Goudrian model in studying laws of reflection in vegetation-soil system in optical range. 2: Influence of illumination conditions on spectral brightness coefficients N85-26827
Analysis of mesofissuring on space photographs: New technique for study of petroleum and gas deposits N85-26828
Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and photomaps N85-26829
Forecasts on long-range development of space programs N85-26830
US said to seek military advantage in space N85-26831
Military journal on US intelligence satellites N85-26832
East Europe report: Science and technology
[JPRS-ESA-84-032] N85-26833
Contribution to space program reviewed N85-26834
USSR report: Engineering and equipment
[JPRS-UEQ-84-006] N85-27035
Solar elements with distributed parameters N85-27036
Structural design and kinematic configuration of two-armed robots N85-27037
Experience with introduction of Finish perforation of precision parts for optical instruments N85-27038
Calculating reliability and productivity of cold stamping robot complex as queuing system N85-27039
Method of selecting robotized system design for pressing process N85-27040
Experience of sheet stamping robotic complexes N85-27041
Automatic manipulators for forging rollers N85-27042
Updating model RPD-1.25 industrial robot N85-27043
Industrial robots and automatic manipulators for forging and pressing operations at Second International Exhibition N85-27044
New stage in robotics development N85-27045
Non-contact hydrostatic bearings N85-27046
Control of motion of manipulator robots on basis of first-order kinematic algorithms N85-27047
Electric motors with elastically mounted rotors N85-27048
Optimal control of electric drive with simultaneous control inputs for motor current and flux N85-27049
Estimates of errors of a gyroscope stabilized platform N85-27050
Errors in compensating for image oscillation by means of a gyroscopic head N85-27051
Holographic lens for optical correlator N85-27052
Impact of optical inhomogeneity in sintered interface between glasses on laser emission characteristics N85-27053
Mirror accessory for line straightening in diffraction spectrometers N85-27054
Operation of autotracking system in various video playback modes N85-27055
Approximate solution of the problem of fluid oscillations in cavities of revolution N85-27056
Turbulent flow of fluid near trailing edge of plate in stream at zero angle of attack N85-27057
Optimum geometry of interblade passages in impellers of thermomolecular vacuum pump N85-27058
Flow around rotating and nonmoving circular cylinder near flat screen. Report 1: Aerodynamic forces in cylinder N85-27059
Parametric study of autooscillation upon flow of supersonic jet into cylindrical cavity N85-27060
Study of stresses on surface of flat barrier immersed in under expanded jet of rarefied gas N85-27061
Aerodynamic forces developing in channels between vanes in turbine drive wheels N85-27062
Hypersonic nonequilibrium gas flow past zero-aspect wing N85-27063
Boundary layer at moving cylinder surface N85-27064
Stability of anisotropic cylindrical sandwich shells N85-27065
Study of oscillations of composite cylindrical shells using a dynamic stiffness technique N85-27066
Stressed-strained state of tubular shells under uniformly distributed pressure N85-27067
Research in the field of rib stiffened shell stability N85-27068
Stressed state of multilayer thick-walled longitudinally corrugated cylinders N85-27069
Tooth wear in worm gears in vacuum N85-27070
USSR report: Machine tools and metalworking equipment
[JPRS-UMM-84-010] N85-27071
Institute's contribution to Soviet welding technology noted N85-27072
Status, prospects of computer-aided design discussed N85-27073
New robotized, vertical broaching machine featured N85-27074
Development, implementation of industrial lasers reviewed N85-27075
Guidelines for optimization of robotized machining cells N85-27076
East Europe report: Science and technology
[JPRS-ESA-85-019] N85-27077
Paton Institute expert on GDR-USSR welding research N85-27078
International cooperation in space exploration N85-27079
Uses of laser technology described N85-27080
Research on products obtained by powder metallurgy N85-27081
China report: Science and Technology
[JPRS-CST-85-012] N85-27300
Fujian forges ahead in electronic production N85-27301
China's integrated circuit production N85-27302
Organizing geological work tasks for 1985 outlined N85-27303
Synthetic aperture side-looking radar image adjustment N85-27304
New image deblurring method described N85-27305
Astrometric method advances Astronomy, geodesy N85-27306
USSR report: Earth sciences
[JPRS-UES-85-005] N85-27307
Cloud-seeding for regulating precipitation in Moscow area N85-27308
Lightweight aerological radiosonde MARZ N85-27309
Greenhouse effect in Earth's primordial atmosphere N85-27310
Regularities in recent changes in surface air temperature and atmospheric precipitation fields N85-27311
Internal waves in layers of Earth's upper mantle N85-27312

Results of simultaneous measurements of absorption and polarization of radio waves reflected from ionosphere N85-27313
Turbopause as source of internal gravity waves N85-27314
Study of spatial distribution of auroras N85-27315
Full shadow phenomenon in Earth's upper atmosphere N85-27316

K

KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
Modeling the backscattering and transmission properties of vegetation canopies
[E85-10099] N85-27320
Microwave model prediction and verifications for vegetated terrain
[E85-10102] N85-27322
KARLSRUHE UNIV. (WEST GERMANY).
Experimental investigations of prismatic cylinders in flow with harmonic pulsations
[KU-SFB-210/E/4] N85-27186
KAWASAKI HEAVY INDUSTRIES, LTD., AKASHI (JAPAN).
The role of computational fluid dynamics in aeronautical engineering N85-26629
KENTUCKY UNIV., LEXINGTON.
In plane stress analysis
[NASA-CR-175775] N85-27259
KIEL UNIV. (WEST GERMANY).
The fast individualists in the solar system: Cosmic rays N85-27806
KIRUNA GEOPHYSICAL INST. (SWEDEN).
A method of solving the dispersion equation for electrostatic electron waves in magnetized plasma
[KGI-PREPRINT-071] N85-27697
KONGSBERG VAPENFABRIKK A/S (NORWAY).
Cost-effective missile guidance through distributed architecture and standard processes N85-26662
KYOTO TECHNICAL UNIV. (JAPAN).
Recent progress in computational aerodynamics N85-26626

L

LABORATOIRE D'AEROTHERMIQUE DU CNRS, MEUDON (FRANCE).
Measurements in low pressure flow using an electronic beam detector N85-26676
LABORATOIRE DE METEOROLOGIE DYNAMIQUE DU CNRS, PALAISEAU (FRANCE).
Long term drifting float for measuring mean oceanic circulation using ARGOS system N85-27339
LIBRARY OF CONGRESS, WASHINGTON, D. C.
Soviet space programs, 1976-1980 (with supplementary data through 1983). Part 3: Unmanned space activities
[S-PRT-98-235-PT-3] N85-27765
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
DARPA/TTO program IR binary optics
[AD-A152196] N85-27672
LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762
LITTON GUIDANCE AND CONTROL SYSTEMS, WOODLAND HILLS, CALIF.
Laser gyroscope random walk determination using a fast filtering technique N85-26647
LOCKHEED-CALIFORNIA CO., BURBANK.
Demonstration of relaxed stability on a commercial transport N85-26745
LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Numerical analysis of flow non-uniformity in the hot gas manifold of the Space Shuttle main engine N85-26899
LONDON UNIV. (ENGLAND).
The aerodynamics of controls N85-26748
LOS ALAMOS SCIENTIFIC LAB., N. MEX.
In-situ rock melting applied to lunar base construction and for exploration drilling and coring on the moon
[DE85-006716] N85-26770
Solution softening in molybdenum-rhenium alloys
[DE85-006706] N85-26972
Microwave processing of lunar materials: Potential applications
[DE85-007223] N85-27003
Model for computing late detonations initiated in propellants by impact (XDT reactions)
[DE85-007377] N85-27019
Generalization of the Child-Langmuir relation for 1-dimensional time-dependent diodes
[DE85-007386] N85-27152
Sodium and lithium corrosion in molybdenum heat pipes
[DE85-005561] N85-27179
Management of vacuum leak-detection processes, standards and calibration
[DE85-006705] N85-27202
Two-dimensional beat wave acceleration simulation
[DE85-005961] N85-27214
Design optimization of singlemain-amplifier KrF laser-fusion systems
[DE85-007680] N85-27215
Mechanical properties of lunar materials under anhydrous, hard vacuum conditions: Applications of lunar glass structural components
[DE85-006682] N85-27271
Nonlinear DSA difference schemes for radiative transfer applications
[DE85-005729] N85-27611
Energy deposition from particle beams
[DE85-007382] N85-27654
Surveying and optical tooling technologies combined to align a skewed beamline at the LAMPF accelerator
[DE85-005902] N85-27664
Optimizing computational efficiency and user convenience in plasma simulation codes
[DE85-007661] N85-27682
Fundamentals of plasma simulation
[DE85-007699] N85-27683
Fusion-power-core design of a Compact Reversed-Field Pinch Reactor (CRFPR)
[DE85-007710] N85-27692
Optical pulsar in the Large Magellanic Cloud remnant 0540-69.3
[DE85-006707] N85-27788
Hydrogen recovery from extraterrestrial materials using microwave energy
[DE85-006717] N85-27789
Neutrino measurements on the Moon
[DE85-007700] N85-27791
Surface exploration geophysics applied to the Moon
[DE85-006714] N85-27793
LOWELL OBSERVATORY, FLAGSTAFF, ARIZ.
Monodeurated methane in the outer solar system. 2. Its detection on Uranus at 1.6 microns
[NASA-CR-175762] N85-27782

M

MARCONI AVIONICS LTD., ROCHESTER (ENGLAND).
Navigation: Accounting for copy N85-26641
The impact of VLSI on guidance and control system design N85-26654
MARYLAND UNIV., COLLEGE PARK.
Application of hierarchical data structures to geographical information systems
[AD-A152169] N85-27753
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Rapid solidification of candidate ferritic steels
[DE85-006596] N85-26971
Predicting fully plastic mode 2 crack growth from an asymmetric defect
[AD-A152227] N85-27269
Active and passive remote sensing of ice
[AD-A151741] N85-27369
Atmospheric frontal zone studies
[NASA-CR-175293] N85-27469
Time-resolving electron temperature diagnostic for ALCATOR C
[DE85-004916] N85-27690
MASSACHUSETTS UNIV., AMHERST.
A climatic data bank for Northern Hemisphere land areas, 1851-1980
[DE85-007863] N85-27486
MATERIALS RESEARCH LABS., MELBOURNE (AUSTRALIA).
Spectroscopic studies of a railgun muzzle flash
[MRL-R-952] N85-26837
MAX-PLANCK-INST. FUER AERONOMIE, KATLENBURG-LINDAU (WEST GERMANY).
Ten years solar wind experiments on Helios 1 and Helios 2 N85-27798
MAX-PLANCK-INST. FUER ASTRONOMIE, HEIDELBERG (WEST GERMANY).
Zodiacal light: A replica of the interplanetary dust cloud N85-27796
MAX-PLANCK-INST. FUER KERNPHYSIK, HEIDELBERG (WEST GERMANY).
The micrometeorite experiment on Helios N85-27797
MAX-PLANCK-INST. FUER PLASMAPHYSIK, GARCHING (WEST GERMANY).
Energy reflection coefficient for H+ ions at energies between 10 and 80 keV
[DE85-007547] N85-27662
MCDONNELL AIRCRAFT CO., ST. LOUIS, MO.
Operational and developmental experience with the F/A-18A digital flight control system N85-26742
MCELROY (RALPH) CO., AUSTIN, TEX.
Material for electrodes of pulsed and arc sources of light
[DE85-007453] N85-27156
Method of fabricating material for the electrodes of gas discharge devices
[DE85-007452] N85-27157
MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
Development and application of a unified balancing approach with multiple constraints N85-26891
MELBOURNE UNIV., CARLTON (AUSTRALIA).
Wave propagation in density stratified fluids N85-27162
MERCK (E.), DARMSTADT (WEST GERMANY).
Nematic liquid crystals for car dashboards
[BMFT-FB-T-84-298] N85-27718
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., BREMEN (WEST GERMANY).
The application of computer aided structural optimization to the design of aircraft components
[MBB-UT-21/84-O] N85-27728
The Helios missions N85-27795
The significance of Helios for Europe N85-27808
Managerial benefits of Helios for the European industry N85-27809
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., HAMBURG (WEST GERMANY).
Realisation of relaxed static stability on a commercial transport N85-26746
Utilization of an automated riveting system in aircraft construction
[MBB-UT-11/84-O] N85-27736
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., MUNICH (WEST GERMANY).
Some aspects of how to design cost-effective flight control systems N85-26639
Terrain following without use of forward looking sensors N85-26659
The flight control system for the Experimental Aircraft Programme (EAP) demonstrator aircraft N85-26755
New flow physical aspects in aerodynamics
[MBB-FE-122/S/PUB/133] N85-27725
Some aspects of how to design cost-effective flight control systems
[MBB-LKE-32/S/PUB/143] N85-27729
Flight test support aircraft Advanced Technologies Testing Aircraft System (ATTAS) for the DFVLR
[MBB-FE-732/S/PUB/154] N85-27730
Advanced flight simulation for helicopter development
[MBB-UD-416/84-O] N85-27731
Investigations of the accuracy of the Digital Photogrammetry System (DPS), a rigorous three-dimensional compilation process for pushbroom imagery
[MBB-UA-753/83-O] N85-27734
Transient behavior of a single-blade horizontal-axis wind turbine
[MBB-UD-421/84-O] N85-27737
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
Some flight test results with redundant digital flight control systems N85-26739
Research and development. Technical and scientific reports 1984 N85-27724
Ultrasonic testing of carbon fiber reinforced plastics (CFRP) using pattern recognition methods
[MBB-BB-563/84-0] N85-27726
Characteristics and applications of superplastic materials for aeronautics
[MBB-BB-565/84-O] N85-27727
Modular Optoelectronic Multispectral Scanner (MOMS) for Earth observation. First results of STS-7 mission
[MBB-UR-717/83-O] N85-27732
Station for in-orbit testing of satellites
[MBB-UR-708/84-O] N85-27733
The PINGUIN B3: A remotely piloted vehicle for mine identification and disposal
[MBB-UM-1/84-O] N85-27735
The technological gains of Helios for the European industry N85-27810
METALS SOCIETY, LONDON (ENGLAND).
Echo-response from crack-like two-dimensional reflectors in focused ultrasonic fields. Ultrasonic crack tip method for the determination of crack depth
[BLL-BISI-22062-(9022.06)] N85-27236
METECH, INC., ELVERSON, PA.
The replacement of precious metal thick film inks using conductive polymer technology
[AD-A152002] N85-26965
MICHIGAN UNIV., ANN ARBOR.
A feasibility study for using low boiling point fluids to change aircraft tire deflection
[AD-A152096] N85-26701

MIDWEST RESEARCH INST., GOLDEN, COLO.
Technical and economic analysis of liquid fuel production from microalgae
[DE85-002926] N85-27018
An evaluation of thermal storage for liquid-metal, solar thermal receivers
[DE85-002929] N85-27394
Polycrystalline semiconductor heterojunction modelling (CdS/CuInSe(sub)2)
[DE85-002913] N85-27713
MINNESOTA UNIV., MINNEAPOLIS.
Evidence concerning the generation mechanism of solar type 3 radio bursts N85-27802
MITSUBISHI HEAVY-INDUSTRIES LTD., NAGOYA (JAPAN).
Computational aerodynamics for aircraft wing design N85-26627
MITSUBISHI HEAVY-INDUSTRIES LTD., TOKYO (JAPAN).
Computational aerodynamics in designing aircraft N85-26622
MONSANTO RESEARCH CORP., DAYTON, OHIO.
Damage caused to polyurethane foams by aging, simulated sunlight exposure, heat and fire
[AD-A152040] N85-26998
MONSANTO RESEARCH CORP., MIAMISBURG, OHIO.
An analysis of alternate hydrogen sources for lunar manufacture
[DE85-007234] N85-27792
MONTREAL UNIV. (QUEBEC).
Studies of hot B subdwarfs. Part 2: Energy distributions of three bright sdB/sdOB stars in the 950-5500 angstrom range
[NASA-CR-175854] N85-27775
MOTE MARINE LAB., SARASOTA, FLA.
Review and annotated bibliography of benthic studies in coastal and estuarine areas of Florida with a selected compilation of worldwide benthic methodological references and southeastern United States benthic taxonomic references
[PB85-151041] N85-27405

N

NAGOYA UNIV. (JAPAN).
Ballooning beta limits of dee and bean shaped Tokamaks
[IPPJ-713] N85-27676
Poloidal rotation of magnetic fluctuations in reversed field pinch plasma
[IPPJ-715] N85-27677
Magnetohydrodynamic stability of spheromak plasma in toroidal flux conserver with rectangular cross section
[IPPJ-716] N85-27678
High energy particle acceleration by coherent electromagnetic waves propagating across the magnetic field
[IPPJ-717] N85-27679
TOKASTAR: A Tokamak stellarator hybrid with possible bean-shaped operation
[IPPJ-718] N85-27680
Velocity space diffusion of high energy ions induced by a lower hybrid wave in a nonuniform magnetic field
[IPPJ-714] N85-27681
NATAL UNIV., DURBAN (SOUTH AFRICA).
A wind-bivane/microprocessor system for on-line prediction and display of pollutant distributions N85-27449
Use of a network of telemetered meteorological stations for prediction of the distribution of an atmospheric tracer N85-27458
NATAL UNIV., PIETERMARITZBURG (SOUTH AFRICA).
Precipitable water in the atmosphere, determined from surface dewpoint values N85-27457
NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Activities of the Aeronautics and Space Engineering Board
[NASA-CR-175825] N85-26610
Space Station Engineering and Technology Development
[NASA-CR-175806] N85-26851
Genetic engineering of plants: Agricultural research opportunities and policy concerns
[DE85-006771] N85-27513
NATIONAL AERO- AND ASTRONAUTICAL RESEARCH INST., AMSTERDAM (NETHERLANDS).
How to handle failures in advanced flight control systems of future transport aircraft N85-26752
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Microgravity: A new tool for basic and applied research in space
[EP-212] N85-26767
The NASA Space Station program plans
[NASA-TM-87474] N85-26846
Spacestation: The next logical step
[NASA-EP-213] N85-26847
NASA Oceanic Processes Program annual review
[NASA-TM-87565] N85-27503
Aerospace medicine and biology: A continuing bibliography with indexes, supplement 271, May 1985
[NASA-SP-7011(271)] N85-27514
Bioengineering and rehabilitation: Windows of opportunity past, present and future
[NASA-EP-216] N85-27516
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Finite-difference computations of rotor loads
[NASA-TM-86682] N85-26669
Application of CFD techniques toward the validation of nonlinear aerodynamic models
[NASA-TM-86715] N85-26671
A numerical simulation of the NFAC (National Full-scale Aerodynamics Complex) open-return wind tunnel inlet flow
[NASA-TM-86724] N85-26672
Formulation and implementation of nonstationary adaptive estimation algorithm with applications to air-data reconstruction
[NASA-TM-86727] N85-26699
Piloted simulation of one-on-one helicopter air combat at NOE flight levels
[NASA-TM-86686] N85-26720
Development and flight test of a helicopter, X-band, portable precision landing system concept
[NASA-TM-86710] N85-26721
Observations, theoretical ideas and modeling of turbulent flows: Past, present and future
[NASA-TM-86679] N85-27167
Nonlinear equations for dynamics of pretwisted beams undergoing small strains and large rotations
[NASA-TP-2470] N85-27258
The introduction of new cockpit technology: A human factors study
[NASA-TM-86659] N85-27528
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. HUGH L. DRYDEN FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
Active control technology experience with the Space Shuttle in the landing regime N85-26747
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Space Station Spartan study
[NASA-TM-86215] N85-26852
Topex Gravity Model Development Team activities during fiscal year 1984
[NASA-TM-86208] N85-27285
Status of the observational data sets N85-27286
Satellite physical and orbital characteristics N85-27287
Satellite selection criteria N85-27288
Gravity model development software status N85-27289
Optical best arc RMS test results N85-27290
Ocean tide models for Topex analysis N85-27291
Radial orbit error spectrum for Topex N85-27292
The size of a gravitational field model for Topex N85-27293
The selection of the starting field: General versus tailored model N85-27294
Simultaneous Earth observations from 2 satellites
[NASA-TM-86204] N85-27325
The ARGOS system used for tracking gray whales N85-27347
Assessment of VAS soundings in the analysis of a preconvective environment
[NASA-TM-86205] N85-27427
A survey of major east coast snowstorms, 1960-1983. Part 2. Summary of surface and upperlevel characteristics
[NASA-TM-86195] N85-27471
A survey of major east coast snowstorms, 1960-1983. Part 2: Case studies of eighteen storms
[NASA-TM-86196] N85-27472
An interplanetary magnetic field ensemble at 1 AU
[NASA-TM-86209] N85-27784
Direct evidence for solar wind control of Jupiter's hectometer-wavelength radio emission
[NASA-TM-86073] N85-27790
Rome/Goddard Space Flight Center (GSFC) magnetic field experiment: A summary of results N85-27800
The Helios radio astronomy experiment N85-27803
Results from the Helios galactic and solar cosmic ray experiment (E7) N85-27807
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Orbiter middeck/payload standard interfaces control document
[NASA-TM-87473] N85-26840
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Exploratory wind-tunnel investigation of a wingtip-mounted vortex turbine for vortex energy recovery
[NASA-TP-2468] N85-26667
An experimental and analytical study of the aerodynamic interference effects between two Sears-Haack bodies at Mach 2.7
[NASA-TM-85729] N85-26673
Comparison of wind velocity in thunderstorms determined from measurements by a ground-based Doppler radar and an F-106B airplane
[NASA-TM-86348] N85-26687
Planning fuel-conservative descents in an airline environmental using a small programmable calculator: Algorithm development and flight test results
[NASA-TP-2393] N85-26705
Active control landing gear for ground loads alleviation N85-26749
NASA/aircraft industry standard specification for graphite fiber toughened thermoset resin composite material
[NASA-RP-1142] N85-26923
Effect of low-velocity or ballistic impact damage on the strength of thin composite and aluminum shear panels
[NASA-TP-2441] N85-26924
Evaluation of experimental epoxy monomers
[NASA-TM-87476] N85-26996
Vortex studies relating to boundary layer turbulence and noise
[NASA-TM-87475] N85-27169
SAM II measurements of the polar stratospheric aerosol. Volume 6: April to October 1981
[NASA-RP-1141] N85-27422
Kinematic rate control of simulated robot hand at or near wrist singularity
[NASA-TP-2440] N85-27575
On the relation between upwind-differencing schemes of Godunov, Engquist-Osher and Roe
[NASA-CR-175805] N85-27583
An abstract specification language for Markov reliability models
[NASA-TM-86423] N85-27616
Tables of nuclear cross sections for galactic cosmic rays: Absorption cross sections
[NASA-RP-1134] N85-27665
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Aerodynamic detuning analysis of an unstalled supersonic turbofan cascade
[NASA-TM-87001] N85-26670
Low-speed aerodynamic test of an axisymmetric supersonic inlet with variable cowl slot
[NASA-TM-87039] N85-26710
Thrust chamber life prediction N85-26865
Rocket thrust chamber thermal barrier coatings N85-26867
Nonlinear structural analysis for fiber-reinforced superalloy turbine blades N85-26887
Preliminary results on passive eddy current damper technology for SSME turbomachinery N85-26890
Fuel and oxidizer turbine loss analysis N85-26900
Redistribution of the inlet temperature profile through the SSME fuel turbine N85-26901
Analytical study of flow phenomena in SSME turnaround duct geometries N85-26902
Instrumentation technology overview N85-26903
Tethered nuclear power for the Space Station
[NASA-TM-87023] N85-26912
Graphite fiber intercalation: Dynamics of the bromine intercalation process
[NASA-TM-87015] N85-26921
Properties and microstructures for dual alloy combinations of three superalloys with alloy 901
[NASA-TM-86967] N85-26963
Multiaxial and thermomechanical fatigue considerations in damage tolerant design
[NASA-TM-87022] N85-26964
Effects of wear on structure-sensitive magnetic properties of ceramic ferrite in contact with magnetic tape
[NASA-TM-87007] N85-26991
Environmental stability of intercalated graphite fibers
[NASA-TM-87025] N85-26992
Effect of counterface material type and its topography on the tribological properties of polyimide composites
[NASA-TM-87036] N85-26993

Flow rate and pressure profiles for 1 to 4 axially aligned orifice inlets
[NASA-TP-2460] N85-27165
Fatigue criterion to system design, life and reliability
[NASA-TM-87017] N85-27226
Life and reliability modeling of bevel gear reductions
[NASA-TM-87006] N85-27227
Fatigue life analysis of a turboprop reduction gearbox
[NASA-TM-87014] N85-27228
A computer analysis program for interfacing thermal and structural codes
[NASA-TM-87021] N85-27264
Effect of precipitation on wind turbine performance
[NASA-TM-86986] N85-27385
Photovoltaic powered vaccine refrigerator-freezer systems field test results
[NASA-TM-86972] N85-27386
Cycling performance of the iron-chromium redox energy storage system
[NASA-TM-87034] N85-27387
Overview of the 1985 NASA Lewis Research Center SP-100 free-piston Stirling engine activities
[NASA-TM-87028] N85-27769

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Advanced High Pressure O2/H2 Technology
[NASA-CP-2372] N85-26862
Manufacturing and producibility technology N85-26866
Vacuum plasma coatings for turbine blades N85-26869
Material technology N85-26870
Development of hydrogen resistant alloys N85-26873
High-pressure hydrogen testing of single crystal superalloys for advanced rocket engine turbopump turbine blades N85-26875
Bearings working group N85-26878
Rolling contact fatigue life of chromium ion plated 440C bearing steel N85-26882
Technical overview structural dynamics N85-26883
Rotordynamics N85-26888
Rotor response for transient unbalance changes in a nonlinear simulation N85-26892
Damping seals for turbomachinery N85-26894
Fluid and gas dynamics N85-26897
Ignition/combustion processes N85-26909
Formulation/cure technology for ultrahigh molecular weight silphenylene-siloxane polymers
[NASA-TP-2476] N85-26990
Span graphics display utilities handbook, first edition
[NASA-TM-86500] N85-27567

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).
Proceedings of the NAL Symposium on Aircraft Computational Aerodynamics
[NAL-SP-1] N85-26611
Computer software for aerodynamic design of aircraft developed within the National Aerospace Laboratory N85-26613
An approximation theory for nonlinear evolution equations and single conservation laws N85-26614
Numerical simulation of inviscid compressible flow through three-dimensional cascade N85-26619
A numerical procedure on three-dimensional parabolic flow in duct N85-26620
Application of conformal mapping to grid generation N85-26621
Numerical example of three-dimensional flying object in shockless transonic flow N85-26623
Navier-Stokes solution of hypersonic blunt-nosed body flowfields N85-26624
Numerical simulation of transonic flutter of a high-aspect ratio transport wing N85-26630
A numerical design method for three-dimensional transonic wings N85-26631
Three-dimensinal wing boundary layer analysis program BLAY and its application N85-26632

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.
Ignition of metals in high pressure oxygen N85-26674
Vortex shedding flowmeters for liquids at high flow velocities N85-26906

NATIONAL BUREAU OF STANDARDS, GAITHERSBURG, MD.
Significant parameters for predicting flame spread
[PB85-176002] N85-27034
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762
NBS (National Bureau of Standards) research reports
[PB85-127421] N85-27764

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
NBS physical measurement services
[NBSIR-84-2875] N85-27633

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.
Circulation statistics from January and July: Simulation with the NCAR (National Center for Atmospheric Research) community climate model (CCMOB)
[PB85-165637] N85-27497

NATIONAL DEPT. OF WATER AND ELECTRICAL ENERGY, BRASILIA (BRAZIL).
The ARGOS system in Brazil N85-27349

NATIONAL ENVIRONMENTAL SATELLITE SERVICE, WASHINGTON, D. C.
Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones
[PB85-164984] N85-27499

NATIONAL FISHERIES RESEARCH LAB., COLUMBIA, MO.
Acid rain: Effects on fish and wildlife
[PB85-154672] N85-27402

NATIONAL GEOPHYSICAL DATA CENTER, BOULDER, COLO.
Solar-Geophysical Data Number 484, December 1984. Part 1 (prompt reports): Data for November 1984, October 1984 and late data
[NASA-CR-175829] N85-27819
Solar-Geophysical Data Number 484, December 1984. Part 2 (comprehensive reports): Data for June 1984, January 1982 and Miscellanea
[NASA-CR-175826] N85-27820

NATIONAL MARINE FISHERIES SERVICE, WOODS HOLE, MASS.
MARMAP survey of the continental shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia (1977 - 1983). Atlas 1: Summary of operations
[PB85-150965] N85-27506

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ANN ARBOR, MICH.
Great Lakes winter weather and ice conditions for 1982-83
[PB85-165009] N85-27498

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BAY ST. LOUIS, MISS.
Development of a Lagrangian drifting buoy N85-27338

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
SESC (Space Environment Services Center) satellite broadcasting 10-year plan
[PB85-163541] N85-27126
Evaluation of the PROFS (Program for Regional Observing and Forecasting Services) 1982, real-time forecast experiment
[PB85-159747] N85-27495
Geophysical monitoring for climatic change, number 12
[PB85-172278] N85-27496
Solar activity monitoring satellite (SAMSAT): Impact on space environment services
[PB85-165066] N85-27818

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, MIAMI, FLA.
Hurricane Research Division, fiscal year 1984 programs, fiscal year 1985 projections N85-27491

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, PRINCETON, N.J.
Comparison of circulation statistics based on FGGE (First GARP Global Experiment) level 3-B analyses produced by GFDL (Geophysics Fluid Dynamics Laboratory) and ECMWF (European Centre for Medium Range Weather Forecasts) for special observing periods
[PB85-153948] N85-27492

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.
Monthly and seasonal weather outlook for February 1985, volume 39, number 3, January 30, 1985
[PB85-159424] N85-27502

NATIONAL PHYSICAL RESEARCH LAB., PRETORIA (SOUTH AFRICA).
Symposium on Atmospheric Sciences in South Africa
[CSIR-S-331] N85-27442
The seasonal cycle of atmospheric CO in the Southern Hemisphere N85-27447
Ground-based remote sensing of atmospheric pollution N85-27462

NATIONAL RADIO ASTRONOMY OBSERVATORY, CHARLOTTESVILLE, VA.
The structure of galactic HI in directions of low total column density
[NASA-CR-175709] N85-27785

NATIONAL RESEARCH INST. FOR MATHEMATICAL SCIENCES, PRETORIA (SOUTH AFRICA).
General continuous formulations of atmospheric energy laws N85-27448
A split explicit model for short-term numerical weather prediction N85-27460
The essence of invexity
[CSIR-TWISK-321] N85-27626

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.
Earth station antenna sidelobe characteristics
[PB85-164986] N85-27159

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
Aircraft accident report: United Airlines Flight 663, Boeing 727-222, N7647U, Denver, Colorado, May 31, 1984
[PB85-910405] N85-26686

NATIONAL WEATHER SERVICE, WASHINGTON, D.C.
Monthly and seasonal weather outlook for mid-January to mid-February 1985, volume 39, number 2, January 15, 1985
[PB85-164572] N85-27500

NAVAL ACADEMY, ANNAPOLIS, MD.
Summary of Research, Academic Departments, 1983 - 1984
[AD-A151724] N85-27741

NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
Improving inflight negative Gz restraint for aircrewmen
[AD-A151909] N85-26688

NAVAL AIR SYSTEMS COMMAND, WASHINGTON, D. C.
Design adequacy: An effectiveness factor N85-26642

NAVAL AIR TEST CENTER, PATUXENT RIVER, MD.
Flight testing and development of the F/A-18A digital flight control system N85-26743

NAVAL HEALTH RESEARCH CENTER, SAN DIEGO, CALIF.
Predictors of cold weather health behaviors
[AD-A151910] N85-27529

NAVAL MATERIAL COMMAND, WASHINGTON, D. C.
Navy program manager's guide, 1985 edition
[AD-A151925] N85-27744

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
Test of lidar inversion algorithm sensitivity to atmospheric backscatter and extinction parameters, revision A
[AD-A152082] N85-27671

NAVAL OCEANOGRAPHY COMMAND DETACHMENT, ASHEVILLE, N.C.
Summary of Meteorological Observations, Surface (SMOS), Dallas, Texas
[AD-A150599] N85-27480

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Graphic simulation of a machine-repairman model
[AD-A151761] N85-26633
A preliminary analysis of C-12 aircraft usage by the Navy Air Logistics System
[AD-A151921] N85-26634
AN investigation into the control limitations of a bank to turn missile in the terminal homing phase
[AD-A152193] N85-26696
Criteria for the classification of hydrographic positioning data
[AD-A152283] N85-26697
Determination of quantitative relationships between selected critical helicopter design parameters
[AD-A152034] N85-26700
Dispersion sensitivity of the eight inch advanced ramjet munitions technology projectile due to wind and minor thrust errors
[AD-A152145] N85-26835
An analysis of data dictionaries and their role in information resource management
[AD-A152134] N85-27121
Pulsewidth modulated speed control of brushless dc motors
[AD-A151966] N85-27148
Two-d heat transfer through porous media with heat generation
[AD-A151965] N85-27173
Filmwise condensation of steam on low integral-finned tubes
[AD-A152220] N85-27178
Design and construction of a computer controlled mirothermocouple probe for the study of buoyant jets
[AD-A152224] N85-27199
A general simulation program for robot manipulator arm dynamics
[AD-A152121] N85-27230
Simulation of a synchronously coupled atmosphere-ocean prediction model
[AD-A152020] N85-27482
An evaluation of the performance of a new storm tracking methodology
[AD-A152234] N85-27484

Shape with and without redundant colour as coding mechanism for simulated radar displays in a time-extended simple vigilance task
[AD-A151683] N85-27533

Management aspects of software maintenance
[AD-A152035] N85-27550

A framework for software development
[AD-A152067] N85-27551

Numerical optimization algorithm for engineering problems using microcomputer
[AD-A152135] N85-27554

Development of graphical pole-zero, root-locus, Bode, Nyquist, and Nichols responses using the OPTSYSX program
[AD-A152148] N85-27555

Development of graphical time response using the OPTSYSX program
[AD-A152221] N85-27557

A mathematical model for calculating detection probability of a diffusion target
[AD-A152026] N85-27601

Sensitivity of conditions for lumping finite Markov chains
[AD-A152122] N85-27604

Locally-weighted-regression scatter-plot smoothing (LOWESS): A graphical exploratory data analysis technique
[AD-A152239] N85-27609

An evaluation of discretized conditional probability and linear regression threshold techniques in model output statistics forecasting of visibility over the north Atlantic Ocean
[AD-A151955] N85-27619

The NAVTAG (Naval Tactical Game) system and its modification to include the SH-60B helicopter
[AD-A152004] N85-27624

Development of a modified time delay spectrometry technique for underwater acoustic measurements in a multipath environment
[AD-A152111] N85-27639

A transduction path method of solid state sensor analysis and investigation
[AD-A152123] N85-27707

A summary of the Naval Postgraduate School research program
[AD-A151721] N85-27738

Compilation of abstracts of theses submitted by candidates for degrees
[AD-A151722] N85-27739

Recent Naval Postgraduate School publications
[AD-A151723] N85-27740

Management considerations for an information center
[AD-A151774] N85-27742

Automation of the reporting and tracking requirements of architect-engineering type contracts
[AD-A152218] N85-27745

Internal and external performance measurement methodologies for database systems
[AD-A152025] N85-27751

Data dictionary design as a stepping-stone to DBMS (Data Base Management System) implementation in the Indonesian Army Data Collecting and Processing Service
[AD-A152101] N85-27752

A Dictionary-Directory System (DDS) for the SPLICE system
[AD-A152223] N85-27759

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.

Production of shaped parts of NITINOL alloys by solid-state sintering
[AD-A152089] N85-26966

Effect of nickel addition on the thermal, magnetic and magnetomechanical properties of Fe(80)B(15)Si(5)
[AD-A152281] N85-26967

NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.

Theoretical and experimental comparisons of nearfield electrogalvanic fields due to nonlinear polarization layers
[AD-A152085] N85-27149

NAVAL WEAPONS CENTER, CHINA LAKE, CALIF.

The remote detection of polynuclear aromatic hydrocarbons using laser-induced fluorescence
[AD-A152294] N85-27013

Maintenance of photovoltaic power systems
[AD-A152299] N85-27390

NAVY UNDERWATER SOUND LAB., NEW LONDON, CONN.

An overview of stochastic signal modeling
[AD-A152144] N85-27605

NEW HAMPSHIRE UNIV., DURHAM.

Spatial and temporal visual masking and visibility
[AD-A151968] N85-27524

NEW MEXICO INST. OF MINING AND TECHNOLOGY, SOCORRO.

Neutrino measurements on the Moon
[DE85-007700] N85-27791

NEW MEXICO STATE UNIV., LAS CRUCES.

Experimental testing of cooling by low pressure adsorption in a zeolite
[DE85-007509] N85-26763

NEW SOUTH WALES UNIV., KENSINGTON (AUSTRALIA).

Multivariable statistical modelling and its application N85-27617

NEW SOUTH WALES UNIV., SYDNEY (AUSTRALIA).

Eigenvalue approximation methods for quantum lattice Hamiltonians N85-27627

NEW YORK UNIV., NEW YORK.

Ionization energies of liquids from energy distribution, quantum yield and second derivative curves
[AD-A152210] N85-26948

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.

Studies of structure and modeling in turbulent shear flows
[AD-A151807] N85-27170

NORTH CAROLINA STATE UNIV., RALEIGH.

LU methods for the compressible Navier-Stokes equations N85-27160

Ecology of Pamlico River, North Carolina: An estuarine profile
[PB85-155703] N85-27404

NORTH CAROLINA UNIV., CHAPEL HILL.

Some new estimation methods for weighted regression when there are possible outliers
[AD-A152104] N85-27602

NORWEGIAN METEOROLOGICAL INST., BLINDERN.

An operational buoy network collecting meteorological data N85-27351

NOTRE DAME UNIV., IND.

Alternatives for jet engine control
[NASA-CR-175831] N85-26713

Alternatives for jet engine control
[NASA-CR-175832] N85-26714

Alternatives for jet engine control
[NASA-CR-175833] N85-26715

O

OAK RIDGE NATIONAL LAB., TENN.

Generalized escape system simulation: Its purpose, recent modifications and potential
[DE85-005571] N85-26689

Analysis of alkali liquid metal Rankine space power systems
[DE85-005089] N85-26917

Particulate and whisker toughened alumina composites
[DE85-005239] N85-26930

Simultaneous chemical vapor deposition of SiC-dispersed phase composites
[DE85-007751] N85-26931

Paramagnetic form factors from itinerant electron theory
[DE85-005272] N85-26973

Thermal annealing of Fe implanted Al2O3 in oxidizing and reducing environment: Revised version
[DE85-007546] N85-26983

Ceramic technology for advanced heat engines project
[DE85-004798] N85-27002

Ionic conduction and water diffusion in Li (BETA)-alumina
[DE85-007548] N85-27005

Development of a new faster process for the fabrication of ceramic fiber-reinforced ceramic composites by chemical vapor infiltration
[DE85-007550] N85-27007

New focal plane detector system for the broad range spectrometer
[DE85-005370] N85-27201

Comparison of observed and predicted short-term tracer-gas concentrations in the atmosphere
[DE85-007566] N85-27399

Use of forest modeling to project acid rain effects
[DE85-005251] N85-27400

Interactive effects of acid rain and gaseous air pollutants on natural terrestrial vegetation
[DE85-005255] N85-27401

A procedure for communications with PDP-10 and PDP-11 (IS/1 UNIX) type computers through use of CPT word processing equipment, revision 1
[DE85-007596] N85-27540

Sensitivity of the stationary distribution vector for an ergodic Markov chain
[DE85-006979] N85-27621

Computing the singular value decomposition of a product of two matrices
[DE85-006977] N85-27631

Survey of experimental and theoretical electron-impact ionization cross sections for transition metal ions in low stages of ionization
[DE85-007605] N85-27658

Prospects for developing attractive magnetic fusion concepts
[DE85-006925] N85-27684

Inherent magnetic field error measurements in ELMO Bumpy Torus
[DE85-005855] N85-27685

Charge uncovering effects on flute instabilities in hot electron plasmas
[DE85-006957] N85-27686

Spherical torus, compact fusion at low field
[DE85-006963] N85-27689

Coupled plasma-neutral transport model for the scrape-off region
[DE85-007559] N85-27695

Tokamak systems code
[DE85-008147] N85-27696

Trends in the electric field enhancement of dielectronic recombination cross sections
[DE85-006920] N85-27711

Surface modification of solids
[DE85-007543] N85-27715

Atom location by electron channeling analysis
[DE85-007549] N85-27716

OAK RIDGE Y-12 PLANT, TENN.

[illegible] transform infrared spectrophotometric analysis of resin mix stoichiometry, revision 1
[DE85-007272] N85-26951

Evaluation of the corrosion properties of aluminum alloy 5083 weldments
[DE85-007729] N85-26977

OFFICE DE LA RECHERCHE SCIENTIFIQUE ET TECHNIQUE, BONDY (FRANCE).

Present stage of utilization of the ARGOS system by the ORSTOM hydrological service for hydrometric data collection N85-27348

OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).

La Recherche Aerospatiale Bimonthly Bulletin Number 1984-2, 219/March-April
[ESA-TT-878] N85-26635

La Recherche Aerospatiale Bimonthly Bulletin Number 1984-3, 220/May-June
[ESA-TT-882] N85-26636

La Recherche Aerospatiale Bimonthly Bulletin, Number 1984-4, 221/July-August
[ESA-TT-884] N85-26637

Qualification of a wall gage for the SIMA wagon, adapted to the test of half models motorized by compressed air turbines
[ONERA-PV-1/8068-GY] N85-26677

Synthesis study: Validation of a gust generator in the presence of a model in a wind tunnel
[ONERA-RT-16/5108-RY-051] N85-26678

Preliminary wind tunnel study of the influence of a jet on the unsteady aerodynamics of a turbojet engine
[ONERA-RT-12/5115-RY-230-R-231G] N85-26679

Lightning strikes on aircraft. The TRIP 82 experiment and 3-dimensional electromagnetic interferometry
[ONERA-RF-88/7154-PY] N85-26690

Study of the primary zone of gas turbine hearths
[ONERA-RTS-22/3256-EY] N85-26719

Wing buffeting active control testing on a transport aircraft configuration in a large sonic tunnel N85-26750

Evaluation of the PSP resin as a precursor of carbon
[ONERA-RT-11/1784-M] N85-26932

OHIO STATE UNIV., COLUMBUS.

Directional thermal conductivities of graphite-epoxy composites: 0/90 and 0/+ or - 45/90
[AD-A152209] N85-26929

An atlas of pure water vapor spectra from 500 to 5000/cm, Volume 2
[AD-A151757] N85-26940

Meteorological factors in Earth-Satellite propagation
[NASA-CR-175764] N85-27089

Basic research for the geodynamics program
[NASA-CR-175751] N85-27424

OKLAHOMA STATE UNIV., STILLWATER.

Confined turbulent swirling recirculating flow predictions
[NASA-CR-174917] N85-26716

Turbulence characteristics of swirling flowfields
[NASA-CR-174918] N85-26717

Spectroscopic investigation of materials for frequency agile laser systems
[AD-A151731] N85-27208

Microbial ecology of extreme environments: Antarctic yeasts and growth in substrate-limited habitats
[NASA-CR-175810] N85-27509

OLD DOMINION UNIV., NORFOLK, VA.
Theoretical studies of solar-pumped lasers
[NASA-CR-175801] N85-27206
OPERATIONS RESEARCH, INC., ROCKVILLE, MD.
Consultative Committee for Space Data Systems. Panel 1: Support
[NASA-CR-175786] N85-27090
ORANGE FREE STATE UNIV., BLOEMFONTEIN (SOUTH AFRICA).
A weather service for agriculture N85-27450
OREGON UNIV., EUGENE.
Theory of electron-impact atomic ionization cross sections
[AD-A151763] N85-27648

P

PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Experimental testing of cooling by low pressure adsorption in a zeolite
[DE85-007509] N85-26763
Radioluminescent lighting for rural Alaskan runway lighting and marking
[DE85-007022] N85-26764
Acceptability testing of radioluminescent lights for VFR-night air taxi operations
[DE85-007303] N85-26765
Low dose irradiation creep of pure nickel
[DE85-006320] N85-26975
Acid precipitation in North America: 1980, 1981 and 1982 annual data summaries from acid deposition system data base
[PB85-162477] N85-27410
Upper-air data collection during CAPTEX
[DE85-006300] N85-27438
Evolution of stratospheric aerosol size distribution from ground-based radiometric measurements: A study of El Chichon aerosol
[DE85-007555] N85-27439
Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California
[NASA-CR-3901] N85-27463
Ultrasonic dispersion of soils for routine particle size analysis: Recommended procedures
[DE85-005530] N85-27643
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Secondary ion mass spectrometry studies of solids and surfaces
[AD-A151744] N85-26939
Multiple scattering of electromagnetic waves in discrete random media
[AD-A151766] N85-27112
An X-ray study of residual stresses in narrow groove TIG weldments
[DE85-006485] N85-27274
A data based algorithm for choosing the window width when estimating the integral of f2(x)
[AD-A152093] N85-27553
PIONEER ENGINEERING AND MFG. CO., INC., WARREN, MICH.
Manufacturing cost analysis of a parabolic dish concentrator (General Electric design) for solar thermal electric power systems in selected production volumes
[NASA-CR-175772] N85-27380
POLISH ACADEMY OF SCIENCES, POZNAN.
Consolidation theory with consideration of frame plasticity
[REPT-9/1984] N85-27240
POLISH ACADEMY OF SCIENCES, WARSAW.
Estimation of the depth of a spherical cap in an hydraulic drawing test for some simple conditions of loss of stability
[REPT-4/1984] N85-26956
Automation of the process of speech signal segmentation in an analogic-numeric system
[REPT-5/1984] N85-27082
Field near the front of a signal in a waveguide accomplished with dispersive plasma
[REPT-11/1984] N85-27083
Characteristic functionals of stochastic wave processes
[REPT-14/1984] N85-27084
Adaptation of continuous beams and the method of optimizing the flexibility of their elastic supports. Theorem on maximal adaptation loading, supplement
[REPT-10/1984-SUPPL] N85-27241
Analysis of elastoplastic grids under conditions of variable loads
[REPT-16/1984] N85-27242
Optimal modeling with a minimum of local distortion
[REPT-18/1984] N85-27243
Multinomial form of the solution of problems of the statistics of elastic rectangular disks
[REPT-17/1984] N85-27244
Internal resonance in nonlinear vibrating systems
[REPT-15/1984] N85-27245
Asymptotic solutions of MHD equations with finite conductivity
[REPT-12/1984] N85-27581
POLITECNICO DI MILANO (ITALY).
The evolutive state: A new definition of system state to include sequencing of events N85-26643
POLYTECHNIC INST. OF NEW YORK, BROOKLYN.
Characterization-curing-property studies of HBRF 55A resin formulations
[NASA-CR-175836] N85-26989
PRATT AND WHITNEY AIRCRAFT, EAST HARTFORD, CONN.
Error reduction program
[NASA-CR-174776] N85-27584
PRETORIA UNIV. (SOUTH AFRICA).
Motivation for satellite tracking of southern elephant seals Mirounga leonina at sea N85-27346
PRINCETON COMBUSTION RESEARCH LABS., INC., N.J.
Analysis of combustion oscillations in heterogeneous systems
[AD-A151999] N85-26942
PRINCETON UNIV., N. J.
Robust detection of fading narrow-band signals in non-Gaussian noise
[AD-A152262] N85-27124
Topics in time delay estimation
[AD-A152231] N85-27607
PRINS MAURITS LAB. TNO, RIJSWIJK (NETHERLANDS).
The development of a computational model for a two-dimensional turbulent flow. Part 1: Mathematical background
[VTH-LR-436-PT-1] N85-27188
PURDUE UNIV., LAFAYETTE, IND.
Studies on the processing methods for extraterrestrial materials
[NASA-CR-175778] N85-26768
Initiation, growth and coalescence of small fatigue cracks
[AD-A151799] N85-27265
MOD silver metallization for photovoltaics
[NASA-CR-175773] N85-27381

Q

QUEENSLAND UNIV., ST. LUCIA (AUSTRALIA).
Experimentally determined distribution of stress around a horizontally loaded model pile in dense sand
[CE-43] N85-27239
Groundwater model for an island aquifer: Bribie Island groundwater study
[CE-44] N85-27398

R

R AND D ASSOCIATES, MARINA DEL REY, CALIF.
Automated CPX support system preliminary design phase
[NASA-CR-175784] N85-27091
RAYTHEON CO., GOLETA, CALIF.
Digital RF delay line for ECM (electronic countermeasure) look-through
[AD-A152120] N85-27120
RENSSELAER OBSERVATORY, TROY, N. Y.
Test and modeling for sintering theory
[DE85-007761] N85-27004
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
Investigation to optimize the passive shock wave/boundary layer control for supercritical airfoil drag reduction
[NASA-CR-175788] N85-26665
Mechanical properties of high performance carbon fibers N85-26922
Automatic tracking of crack growth via finite elements N85-27246
RESEARCH INST. OF COLORADO, FORT COLLINS.
High efficiency transverse dc electron beams
[AD-A152038] N85-27651
RICE UNIV., HOUSTON, TEX.
Study of the kinetics and thermodynamics of hydrogen in Pd-based alloys
[DE85-007341] N85-26969
RIJKSWATERSTAAT, THE HAGUE (NETHERLANDS).
Positioning accuracy of the ARGOS system in operational use N85-27335
ROCHESTER UNIV., N. Y.
Transitional metal activation and functionalization of C-H bonds
[DE85-006816] N85-26949
The biological effects of radiofrequency radiation N85-27131
Review of epidemiological studies of human exposures to radiofrequency radiation N85-27134
Quantum statistical theory of vibrational dynamics in a laser-driven admolecule-surface system
[AD-A152022] N85-27719
ROCKETDYNE, CANOGA PARK, CALIF.
Fatigue life extension N85-26864
Ceramics for advanced O2/H2 application N85-26868
Design overview of fiber-reinforced superalloy composites for the Space Shuttle main engine N85-26871
Materials for advanced rocket engine turbopump turbine blades N85-26872
Hybrid bearings for LH2 and LO2 turbopumps N85-26880
Housing flexibility effects on rotor stability N85-26896
Experimental evaluation of an advanced Space Shuttle main engine hot-gas manifold design concept N85-26898
Reusable rocket engine turbopump condition monitoring N85-26907
Nonintrusive shaft speed sensor N85-26908
Liquid rocket combustor computer code development N85-26910
Laser Schlieren and ultraviolet diagnostics of rocket combustion N85-26911
ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Material for protection of metal surfaces against corrosion by molten salts
[DE85-007714] N85-26968
ROCKWELL INTERNATIONAL CORP., SEAL BEACH, CALIF.
A study of spacecraft technology and design concepts, volume 1
[NASA-CR-172579-VOL-1] N85-26844
A study of spacecraft technology and design concepts. Volume 2: Appendices
[NASA-CR-172579-VOL-2] N85-26845
ROME UNIV. (ITALY).
Rome/Goddard Space Flight Center (GSFC) magnetic field experiment: A summary of results N85-27800
ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
The evaluation of ACS for helicopters: Conceptual simulation studies to preliminary design N85-26737
Evaluation of an algorithm for the solution of the time-dependent Euler equations
[AD-A151993] N85-27600
ROYAL INST. OF TECH., STOCKHOLM (SWEDEN).
Solving the minimal least squares problem subject to bounds on the variables
[TRITA-NA-8215] N85-27580
Stability of functionals determined by moment conditions
[TRITA-NA-8310] N85-27585
Explicit construction of contractivity matrices
[TRITA-NA-8309] N85-27586
H-sets, convex programming and constrained approximation
[TRITA-NA-8308] N85-27587
ROYAL NETHERLANDS METEOROLOGICAL INST., DE BILT.
Availability of the ARGOS system based on the orbital characteristics of the TIROS-N satellites N85-27352
ROYAL SIGNALS AND RADAR ESTABLISHMENT, MALVERN (ENGLAND).
An IKBS approach to image understanding
[AD-A151992] N85-27599
RUHR UNIV., BOCHUM (WEST GERMANY).
Remote sensing of the plasma with time delay measurements (coronal sounding) N85-27804
RUPERT INSULATION PROJECTS, INC., ST. PAUL, MINN.
Development of a polystyrene insulation system
[DE85-006950] N85-27180
RUTGERS - THE STATE UNIV., NEW BRUNSWICK, N. J.
Theoretical investigation of three-dimensional shock wave turbulent boundary layer interactions. Part 3
[AD-A152251] N85-27177
RUTGERS UNIV., NEW BRUNSWICK, N. J.
Equation of state and two-body correlations for fluids of non-spherical molecules
[AD-A151969] N85-27174

S

S M SYSTEMS AND RESEARCH CORP., LANHAM, MD.
Validation of the ERBE scanner scene identification methodology: Analysis with Nimbus-7 ERB data
[NASA-CR-172596] N85-27466

SACLANT ASW RESEARCH CENTER, LA SPEZIA (ITALY).
The theoretical response of a vertical line array to wind-generated noise in shallow water
[AD-A151730] N85-27638
SAN FRANCISCO UNIV., CALIF.
Histological and compositional responses of bone to immobilization and other experimental conditions
[NASA-CR-175837] N85-27518
SANDIA LABS., ALBUQUERQUE, N. MEX.
Screening ceramic materials for intense radiant heat applications
[DE85-006989] N85-27006
Surveillance program for the dissection and analysis of explosive and pyrotechnic components
[DE85-006105] N85-27016
Radiation hardening for VLSI applications
[DE85-005493] N85-27155
Pyrotechnic shock simulation using the controlled response of a resonating bar fixture
[DE85-006537] N85-27181
Digital image analysis of four-frame holographic plasma and neutral gas interferograms
[DE85-008397] N85-27200
Accuracy of the calculated stress field around a craze
[DE85-005520] N85-27272
On the accurate representation of large strain non-proportional plastic flow in ductile materials
[DE85-007106] N85-27273
A bibliography of reports of the Sandia solar thermal distributed receiver systems project
[SAND-84-0313] N85-27378
Selection of promising sites for magma energy experiments
[DE85-006832] N85-27393
A Markov method for simulating non-Gaussian wind speed time series
[DE85-007131] N85-27485
SANDIA LABS., LIVERMORE, CALIF.
The 10 MWe solar thermal central receiver pilot plant: Beam safety tests and analyses
[SAND-83-8035] N85-27379
SANTA FE RESEARCH CORP., BLOOMINGTON, MINN.
Air quality benefit analysis for Los Angeles and San Francisco based on housing values and visibility
[PB85-166049] N85-27409
SCHAFER (W. J.) ASSOCIATES, INC., ARLINGTON, VA.
Short Wavelength Chemical Laser (SWCL) Workshop
[AD-A151959] N85-27211
SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.
The cumulative effects of long term exposure to low levels of radiofrequency radiation (RFR) N85-27132
Development and application of new radiofrequency radiation safety standards N85-27137
SCIENCE APPLICATIONS, INC., ROCKVILLE, MD.
LPCVD tungsten deposition on Si-Ge alloy
[DE85-005588] N85-26970
SCOTTISH MARINE BIOLOGICAL ASSOCIATION, EDINBURGH (SCOTLAND).
ARGOS-tracked drifters in the Rockall Trough N85-27340
SEA FISHERIES RESEARCH INST., CAPE TOWN (SOUTH AFRICA).
Air flow of the western coastal boundary of South Africa and its influence on the ocean N85-27459
SENIOR INTERAGENCY GROUP ON INTERNATIONAL COMMUNICATION AND INFORMATION POLICY, WASHINGTON, D.C.
White paper on new international satellite systems
[PB85-162501] N85-27127
SERVICES TECHNIQUE DES PHARES ET BALISES, BONNEUIL-SUR-MARNE (FRANCE).
Checking on the position of navigation marker buoys by the ARGOS system N85-27354
SHUTE (ARTHUR C.), EAST SEBAGO, MAINE.
Water brake convertor: A simple device to convert mechanical energy into heat energy
[DE85-006021] N85-26766
SIMPSON WEATHER ASSOCIATES, CHARLOTTESVILLE, VA.
Influence of coherent mesoscale structures on satellite-based Doppler lidar wind measurements
[NASA-CR-175853] N85-27467
SINGER CO., WAYNE, N. J.
Design-To-Cost (DTC) methodology to achieve affordable avionics N85-26845
SKF INDUSTRIES, INC., KING OF PRUSSIA, PA.
Development of new materials for turbopump bearings N85-26877
SMITH-KETTLEWELL INST. OF VISUAL SCIENCES, SAN FRANCISCO, CALIF.
The origin of brain potentials associated with selective visual attention
[AD-A152291] N85-27511
SMITH (TED B.) AND ASSOCIATES, INC., PASADENA, CALIF.
Utilization of remote sensing data in the evaluation of air pollution characteristics in the south coast/Southeast Desert Air Basin
[PB85-162063] N85-27407
SMITHS INDUSTRIES LTD., BISHOPS CLEEVE (ENGLAND).
The series 2000: A miniature gas bearing DTG for low cost strapdown guidance and control N85-26848
SMITHS INDUSTRIES LTD., LONDON (ENGLAND).
ACT applied to helicopter flight control N85-26738
SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASS.
The investigation of tethered satellite system dynamics
[NASA-CR-175855] N85-26854
SOCIETE CROUZET, VALENCE (FRANCE).
The use of a self-compensated magnetometer in an economical navigation system for the helicopter N85-26650
SOCIETE D'APPLICATIONS GENERALES D'ELECTRICITE ET DE MECANIQUE, PARIS (FRANCE).
Combinatorial performance/cost analysis of an autonomous navigation system for aircraft N85-26640
Preguidance and piloting with the aid of composite inertial sensors N85-26646
SOCIETE FRANCAISE D'EQUIPEMENTS POUR LA NAVIGATION AERIENNE, VELIZY-VILLACOUBLAY (FRANCE).
Gyrolaser guidance system for medium range missiles N85-26649
SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, PARIS (FRANCE).
The certification of airborne complex digital systems N85-26754
SOFTWARE SCIENCES LTD., FARNBOROUGH (ENGLAND).
Maintaining consistency and accommodating network repair in a self-regenerative distributed database management system (a discussion of the means and cost) N85-26656
SOLAREX CORP., ROCKVILLE, MD.
Documentation and solar cell modules
[NASA-CR-175769] N85-27384
SOUTHERN RESEARCH INST., BIRMINGHAM, ALA.
Analytical methods for determination of POHC (Principal Organic Hazardous Constituents) in combustion products
[PB85-161578] N85-26955
SPECTRA RESEARCH SYSTEMS, INC., HUNTSVILLE, ALA.
Advanced rocket engine cryogenic turbopump bearing thermal model N85-26879
SPERRY CORP., PHOENIX, ARIZ.
Impact of magnetic isolation on pointing system performance in the presence of structural flexibility
[NASA-CR-172481] N85-26861
SPRINGBORN LABS., INC., ENFIELD, CONN.
Development of acceptance criteria for batches of silane primer for external tank thermal protection system bonding applications
[NASA-CR-175850] N85-26995
SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Preliminary technology utilization assessment of the robotic fruit harvester
[NASA-CR-175834] N85-27532
STANFORD LINEAR ACCELERATOR CENTER, CALIF.
Local likelihood estimation
[DE85-007238] N85-27620
Discrete foundation for physics and experience
[DE85-008172] N85-27720
Dark matter, galaxies, and large scale structure in the universe
[DE85-008053] N85-27786
STANFORD UNIV., CALIF.
Conducting a wind sensing study
[NASA-CR-175782] N85-27465
STATE UNIV. OF NEW YORK, STONY BROOK.
Conducting a thermal conductivity survey
[NASA-CR-175792] N85-27166
STOCKHOLM UNIV. (SWEDEN).
Theory and modeling of the interaction between subgrid scale orography and large scale flow
[DM-43] N85-27440
SUOMALAINEN TIEDEAKATEMIA, HELSINKI (FINLAND).
Conditions for the possibility of conformal sewing
[ST-AASF-IMD-58] N85-27625
SVERDRUP TECHNOLOGY, INC., ARNOLD AIR FORCE STATION, TENN.
Study on needs for a magnetic suspension system operating with a transonic wind tunnel
[NASA-CR-3900] N85-26759
SYSTEMS CONSULTANTS, INC., SAN DIEGO, CALIF.
Evaluation of Ada (trademark) as a communications programming language, volume 1
[AD-A152314] N85-27559
Evaluation of Ada (trademark) as a communications programming language. Volume 2: Communications protocols application
[AD-A152315] N85-27560
Evaluation of Ada (trademark) as a communications programming language. Volume 3: Trusted software application
[AD-A152316] N85-27561
SYSTEMS SCIENCE AND SOFTWARE, LA JOLLA, CALIF.
Equation of state and two-body correlations for fluids of non-spherical molecules
[AD-A151969] N85-27174
SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF.
A perspective on superaugmented flight control advantages and problems N85-26733

T

TATA INST. OF FUNDAMENTAL RESEARCH, BOMBAY (INDIA).
Schubert varieties are arithmetically Cohen-Macaulay N85-27592
Quadratic spaces over discrete Hodge algebras N85-27593
TECHNICAL RESEARCH CENTRE OF FINLAND, ESPOO.
Dynamic and aeroelastic action of guy cables
[VTT-18] N85-27276
Information presentation in power plant control rooms
[VTT-320] N85-27668
TECHNISCHE HOGESCHOOL, DELFT (NETHERLANDS).
Conical stagnation points in the flow around an external corner
[VTH-LR-396] N85-26680
A computer program for the drag prediction of subsonic, turbine powered aircraft in the en-route configuration
[VTH-LR-412] N85-26681
A curved test section for research on transonic shock wave-boundary layer interaction
[VTH-LR-414] N85-26682
Numerical solution of transonic normal shock wave-boundary layer interaction using the Bohning-Zierop model
[VTH-LR-416] N85-26683
Protective coatings for aircraft structures: A review
[VTH-LR-413] N85-26704
Static longitudinal stability and control characteristics of the Fokker F27 Friendship calculated by simple handbook methods
[VTH-LR-394] N85-26726
Application of linear optimal control theory to the design of the elevator control system of the DHC-2 Beaver experimental aircraft
[VTH-LR-411] N85-26729
Solid fuel combustion chamber
[VTH-LR-415] N85-26918
Solid fuel combustion chamber
[VTH-LR-438] N85-26919
Solid fuel combustion chamber research in the Netherlands
[VTH-LR-444] N85-26920
Durability of Aramid reinforced aluminum laminate (ARALL)
[VTH-LR-423] N85-26933
On the analytic calculation of premixed flames
[VTH-LR-417] N85-26954
The effect of low sheet thicknesses on the fracture toughness of an Al alloy (7075-T6)
[VTH-LR-425] N85-26984
Influence of pretreatment, environment and strain rate on stress corrosion cracking of the aluminum alloy 7075-T6
[VTH-LR-433] N85-26985
Investigation of the pitting potential of rapidly solidified aluminum-lithium alloys
[VTH-LR-434] N85-26986
Investigation of the influence of some paint systems and water displacing corrosion inhibitors on anodic undermining corrosion of aluminum 2024 clad alloy
[VTH-LR-443] N85-27009
An experimental investigation of the interaction between a shock wave and a turbulent boundary layer on a convex wall
[VTH-LR-428] N85-27187
The development of a computational model for a two-dimensional turbulent flow. Part 1: Mathematical background
[VTH-LR-436-PT-1] N85-27188

An approximation to the problem of a pin-loaded hole in an orthotropic plate
[VTH-LR-386] N85-27278
The application of BRILES rivets for mechanical jointing of Aramid Reinforced Aluminum Laminate (ARALL)
[VTH-LR-387] N85-27279
Mechanical jointing in Aramid fiber composites: An experimental study
[VTH-LR-371] N85-27280
An analysis for axially compressed orthotropic shells with a multimode imperfection representation
[VTH-LR-422] N85-27281
Structural stability and bifurcation in conical flow fields
[VTH-LR-424] N85-27282
The practical and theoretical significance of small cracks: An evaluation
[VTH-LR-432] N85-27283
The vector potential in a branched Riemann space
[VTH-LR-395] N85-27614
On various Fourier series utilized for solution of structural mechanics problems
[VTH-LR-429] N85-27615
The statistical analysis of initial imperfection measurements
[VTH-LR-442] N85-27622
Prediction of free-field noise levels from aircraft flyover measurements
[VTH-LR-427] N85-27647

TECHNISCHE UNIV., BRUNSWICK (WEST GERMANY).
The use of pressure sensing taps on the aircraft wing as sensor for flight control systems N85-26660

TECHNISCHE UNIV., MUNICH (WEST GERMANY).
Optimal frequencies for broadcast transmitters in the UHF domain: Report
[TUM-M8404] N85-27088
Generalized graph coloring: A frequency assignment method for VHF broadcasting
[TUM-M8405] N85-27535

TEL-AVIV UNIV. (ISRAEL).
Uniformly high-order accurate non-oscillatory schemes, 1
[NASA-CR-175768] N85-27589

TENNESSEE UNIV., KNOXVILLE.
Nuclear spectroscopic studies
[DE85-006894] N85-27652
Boson degrees of freedom in Fermion many-body systems
[DE85-006997] N85-27660

TEXAS A&M UNIV., COLLEGE STATION.
Vibration characteristics of the HPOTP (High Pressure Oxygen Turbopump) of the SSME (Space Shuttle Main Engine) N85-26895
Luminescence probe studies of ionomers. 2. Steady-state measurements from sulfonated polyethylene and teflon membranes
[AD-A152233] N85-27000
Altimetry data and the elastic stress tensor of subduction zones
[NASA-CR-175796] N85-27425
Management control systems and interdependencies: An empirical study
[AD-A152280] N85-27746

TEXAS UNIV., ARLINGTON.
Reliability models for dataflow computer systems
[NASA-CR-175813] N85-27543

TEXAS UNIV., AUSTIN.
Microscopic study of the influence of impurities on interface bonding
[AD-A151725] N85-26928
Comparison of gravity field solution techniques N85-27295
Optimal relative data weights N85-27296
Atmospheric density model N85-27297
Numerical integration through force discontinuities: Solar radiation pressure N85-27298
Station coordinates and Earth rotation parameters from Lageos laser ranging N85-27299
Interaction of finite-amplitude sound with air-filled porous materials
[NASA-CR-174885] N85-27637
A four-field model for Tokamak plasma dynamics
[DE85-007111] N85-27694

THOMSON-CSF, ISSY LES MOULINEAUX (FRANCE).
Optmizing the specifications for an air-surface laser system N85-26644

THORN EMI, HAYES (ENGLAND).
DB2 and DB3: The next generation N85-27337

TITAN SYSTEMS, INC., MCLEAN, VA.
Future information technology, 1984: Telecommunications
[NBS/SP-500/119] N85-27762

TOHOKU UNIV., SENDAI (JAPAN).
Two computational methods for cascade flows N85-26617
The Record of Electrical and Communication Engineering Conversazione, volume 53, no. 2, November 1984
[ISSN-0385-7719] N85-27022
Historical perspectives on information transmission engineering N85-27023
Proposal of a method for evaluating accuracy of estimated impulse response of a system N85-27024
The design of an English word-processor for scientific and technical use in which superscripts, subscripts and Greek characters are operated by screen-edit. 3 N85-27025
On gravitational waves N85-27026

TOKYO UNIV. (JAPAN).
Progress of computational fluid dynamics in the world N85-26612
Some numerical analyses of flows with separation N85-26616

TORONTO UNIV., DOWNSVIEW (ONTARIO).
Fluid-dynamic model of a downburst
[UTIAS-271] N85-27441

TRACER TECHNOLOGIES, INC., ESCONDIDO, CALIF.
Development of a persistent chemical agent simulation system
[NASA-CR-175780] N85-26937

TRANSPORTATION SYSTEMS CENTER, CAMBRIDGE, MASS.
Hybrid propulsion technologies for urban bus transit
[PB85-157469] N85-27773

TRW AIRCRAFT COMPONENTS GROUP, CLEVELAND, OHIO.
Powder metallurgy bearings for advanced rocket engines N85-26881

TUFTS UNIV., MEDFORD, MASS.
Very large array observations of coronal loops and related observations of solar type stars
[AD-A152027] N85-27817

TURBOMECA S. A. - BREVETS SZYDLOWSKI, BORDES (FRANCE).
Nondestructive tests of ceramic components for aircraft turbines N85-26718

U

UNION CARBIDE CORP., TARRYTOWN, N.Y.
Improved catalysts for liquid hydrocarbon fuels from syngas
[DE85-006569] N85-26947

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, DOUNREAY (SCOTLAND).
Equipment for monitoring low concentrations of volatile substances in gases or liquid metals
[BLL-DOUNREAY-TR-949-(9091.9F)] N85-27190

UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.
Fiber optic Raman thermometer for Space Shuttle main engine preburner profiling N85-26904
Research and development of subsurface acoustic wave devices for sensor applications
[AD-A152197] N85-27642

UNIVERSIDAD NACIONAL AUTONOMA DE MEXICO, MEXICO CITY.
Operation of a low temperature absorption chiller at rating point and at reduced evaporator temperature
[DE85-006308] N85-27030

UNIVERSITY OF CENTRAL FLORIDA, ORLANDO.
A SLAM II simulation model for analyzing space station mission processing requirements
[NASA-CR-175664] N85-26853

UTAH UNIV., SALT LAKE CITY.
The physical interactions of radiofrequency radiation fields and biological systems N85-27129
Acoustic propagation in a thermally stratified atmosphere
[NASA-CR-175787] N85-27636

V

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Thermodynamic evaluation of transonic compressor rotors using the finite volume approach
[NASA-CR-175811] N85-26712
Identification and control of structures in space
[NASA-CR-175790] N85-26850
Temperature: Curvature relationships for unsymmetric graphite-epoxy laminates
[VPI-E-85-08] N85-26926
The effects of pin elasticity, clearance, and friction on the stresses in a pin-loaded orthotropic plate
[NASA-CR-175818] N85-26927
An analytical investigation of dynamic coupling in nonlinear, geared rotor systems N85-27218
Development and application of optimum sensitivity analysis of structures
[NASA-CR-175857] N85-27257
A multifunction wall system for application with solar heating and ground cooling
[DE85-006792] N85-27395

W

WASHINGTON STATE UNIV., PULLMAN.
Investigation of basic characteristics of laser heating in thermoluminescence and of laser-stimulated luminescence
[AD-A152143] N85-27212

WASHINGTON UNIV., SEATTLE.
Thermal consequences of localized SAR from RFR exposures N85-27130
Hazards of VLF electromagnetic fields N85-27136
A study of the effect of gently varying terrain on atmospheric flow near the surface N85-27411
Wave dynamics and transport in the stratosphere
[NASA-CR-175789] N85-27413
Cocycles and magnetic monopole
[DE85-007797] N85-27612
Canonical analysis of the fermion sector in higher-derivative supergravity
[DE85-007828] N85-27635
Comment on quantum effects on 4-dimensional space-time symmetries
[DE85-007780] N85-27722
Mutli-particle quantum mechanics obeying fractional statistics
[DE85-007830] N85-27723
Inflation from extra dimensions
[DE85-007834] N85-27787

WASHINGTON UNIV., ST. LOUIS, MO.
Shuttle imaging radar-A (SIR-A) data analysis
[NASA-CR-175785] N85-27324

WATER RESEARCH COMMISSION, BETHLEHEM (SOUTH AFRICA).
The use of radar in determining precipitation processes in the BEWMEX area N85-27455

WATER RESEARCH COMMISSION, PRETORIA (SOUTH AFRICA).
Effects of cloud seeding on precipitation development in cumulus clouds N85-27458

WEATHER BUREAU, BETHLEHEM (SOUTH AFRICA).
Ice multiplication in summertime cumulus clouds in the BEWMEX area N85-27445

WEATHER BUREAU, PRETORIA (SOUTH AFRICA).
Fog advection in the Namib N85-27454

WEATHER OFFICE, JAN SMUTS AIRPORT (SOUTH AFRICA).
The study of thermal forecasting for gliding N85-27453

WELDING INST., CAMBRIDGE (ENGLAND).
Welder training/welder testing
[BLL-WI-TRANS-683-(9312.57)] N85-27223

WESTERN UNION TELEGRAPH CO., MCLEAN, VA.
Satellite provided customer promises services, a forecast of potential domestic demand through the year 2000. Volume 4: Sensitivity analysis
[NASA-CR-174662] N85-27092

WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
Flat-plate solar array project process development area: Process research of non-CZ silicon material
[NASA-CR-175777] N85-27382

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Effect of dislocations on gallium arsenide FETs
[AD-A152249] N85-27709

WESTINGHOUSE RESEARCH LABS., PITTSBURGH, PA.
Breakway friction and dynamic friction/wear measurements of various ceramic materials from 25 C (75 F) to 650 C (1200 F)
[NASA-CR-174803] N85-26994

WESTLAND HELICOPTERS LTD., YEOVIL (ENGLAND).
The evolution of active control technology systems for the 1990's helicopter N85-26758

WISCONSIN UNIV., MADISON.
Effects of posture and water immersion on diaphragmatic function N85-27515
Rotational energy transfer in highly vibrationally excited hydrogen fluoride and deuterium fluoride
[AD-A152003] N85-27650
The soft X-ray background as a supernova blast wave viewed from inside: Solar abundance models
[NASA-CR-175767] N85-27813

WITWATERSRAND UNIV., JOHANNESBURG (SOUTH AFRICA).
Elemental analysis of aerosols in Transvaal urban and power-producing areas using time and size-resolved samples N85-27443

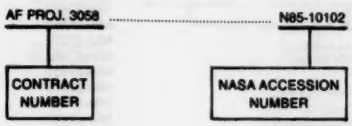
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
An inexpensive radar-responding relocation device for drifting oceanographic instruments
[AD-A152170] N85-27505
WYLE LABS., INC., HUNTSVILLE, ALA.
Signal analysis techniques for incipient failure detection in turbomachinery N85-26884
Flow dynamic environment data base development for the SSME N85-26885
Damping seal verification setup N85-26893
WYOMING UNIV., LARAMIE.
Cloud physics studies in the SCPP (Sierra Cooperative Pilot Project)
[PB85-163095] N85-27501

Y

YALE UNIV., NEW HAVEN, CONN.
Computer program for the calculation of multicomponent convective diffusion deposition rates from chemically frozen boundary layer theory
[NASA-CR-168329] N85-27164
An incremental multigrid strategy for the fluid dynamics equations
[AD-A151953] N85-27172
Population inversion in laser-initiated vacuum arcs
[AD-A151958] N85-27210
Multigrid algorithms on the hypercube multiprocessor
[AD-A152200] N85-27556
Local uniform mesh refinement on loosely-coupled parallel processors
[AD-A152199] N85-27571
Complexity of dense linear system solution on a multiprocessor ring
[AD-A151970] N85-27598
Multiple array processors for ocean acoustic problems
[AD-A152174] N85-27641
On the choice of coordinates for semiconductor simulation
[AD-A152214] N85-27708

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



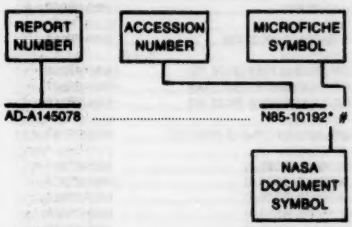
Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

AF PROJ. 1123 ..... N85-27530
AF PROJ. 2305 ..... N85-27123
AF PROJ. 3262 ..... N85-27483
AF-AFOSR-0016-82 ..... N85-27174
AF-AFOSR-0019-83 ..... N85-27817
AF-AFOSR-0040-82 ..... N85-27177
AF-AFOSR-0041-82 ..... N85-27265
AF-AFOSR-0045-80 ..... N85-27524
AF-AFOSR-0057-82 ..... N85-26939
AF-AFOSR-0077-81 ..... N85-27210
AF-AFOSR-0138-82 ..... N85-27175
AF-AFOSR-0267-83 ..... N85-27651
AF-AFOSR-0280-82 ..... N85-27670
AF-AFOSR-0320-83 ..... N85-27511
AF-AFOSR-0360-84 ..... N85-27571
AF-AFOSR-3586-78 ..... N85-26945
ARPA ORDER 3414 ..... N85-27579
ARPA ORDER 4654 ..... N85-27672
ARPA ORDER 4941 ..... N85-26965
BMVG-T/R-760/C-0011/C-1711 ..... N85-27489
CMA-FT-81-355 ..... N85-26936
DA PROJ. EN1-Y N85-26708
DA PROJ. RR0-1103 ..... N85-27650
DA PROJ. 1L1-61101-A-91-A N85-27014
DA PROJ. 1L1-61102-AH-43 ..... N85-26941
N85-27026
DA PROJ. 1L1-61102-H-4503 ..... N85-26924
DA PROJ. 1L1-62618-AH-80 ..... N85-27015
N85-27028
N85-27270
DA-19-129-QM-681 ..... N85-26967
DAAG29-80-C-0041 ..... N85-27589
DAAG29-81-K-0084 ..... N85-26940
DAAG29-82-K-0011 ..... N85-27706
DAAG29-82-K-0041 ..... N85-27208
DAAG29-82-K-0056 ..... N85-27620
DAAG29-83-K-0097 ..... N85-27112
DAAG29-84-K-0140 ..... N85-27568
DAAK70-81-C-0059 ..... N85-27753
DARPA ORDER 5217 ..... N85-27709
DCA100-83-C-0029 ..... N85-27559
N85-27560
N85-27561
DE-AC01-84CE-50071 ..... N85-27017
DE-AC02-76CH-00016 ..... N85-26974
N85-27031
N85-27153
N85-27659
N85-27693
N85-27760
DE-AC02-76EV-03490 ..... N85-27131
N85-27134
DE-AC02-76ET-51:013 ..... N85-27690
DE-AC02-81ER-40038 ..... N85-27721
DE-AC02-81ER10996 ..... N85-27556
N85-27708
DE-AC02-81EV-10739 ..... N85-27486
DE-AC02-83CH-10093 ..... N85-27018
N85-27394
N85-27713
DE-AC02-83CH-10140 ..... N85-27370
DE-AC02-83ER-13095 ..... N85-26949
DE-AC02-83ER-45007 ..... N85-27667
DE-AC03-76SF-00098 ..... N85-26948
N85-26979
N85-26981
N85-27203
N85-27564
N85-27634
N85-27661
N85-27714
N85-27763
DE-AC03-76SF-00515 ..... N85-27620
N85-27655
N85-27720
N85-27786
DE-AC03-83SF-11905 ..... N85-27030
DE-AC04-76DP-00053 ..... N85-27792
DE-AC04-76DP-00613 ..... N85-26950
N85-27029
N85-27158
DE-AC04-76DP-00656 ..... N85-27154
DE-AC04-76DP-00789 ..... N85-26970
N85-27006
N85-27016
N85-27155
N85-27181
N85-27200
N85-27272
N85-27273
N85-27378
N85-27379
N85-27391
N85-27393
N85-27485
DE-AC04-76DP-03533 ..... N85-26968
N85-26980
DE-AC04-81ER-40048 ..... N85-27723
DE-AC05-79ET-13591 ..... N85-27274
DE-AC05-82OR-20900 ..... N85-27178
DE-AC05-84CR-21400 ..... N85-26689
DE-AC05-84OR-21400 ..... N85-26917
N85-26930
N85-26931
N85-26973
N85-26983
N85-27002
N85-27005
N85-27007
N85-27178
N85-27201
N85-27399
N85-27400
N85-27401
N85-27621
N85-27631
N85-27658
N85-27662
N85-27684
N85-27685
N85-27686
N85-27689
N85-27695
N85-27696
N85-27715
N85-27716
DE-AC05-84OS-21400 ..... N85-26951
N85-26977
N85-27540
DE-AC06-76FF-02170 ..... N85-26982
DE-AC06-76RL-01830 ..... N85-26763
N85-26764
N85-26765
N85-26975
N85-27151
N85-27438
N85-27439
N85-27643
DE-AC06-81ER-40048 ..... N85-27612
N85-27635
N85-27722
N85-27767
DE-AC07-76ID-01570 ..... N85-27772
DE-AC08-81NV-10320 ..... N85-27771
DE-AC09-76SR-00001 ..... N85-27231
DE-AC09-84OR-21400 ..... N85-27711
DE-AC22-84PC-70028 ..... N85-26947
DE-AI01-76ET-20320 ..... N85-27385
DE-AI01-79ET-20485 ..... N85-27386
DE-AI01-80CS-50194 ..... N85-26994
DE-AI04-80AL-12726 ..... N85-27387
DE-AI05-82OR-1005 ..... N85-27769
DE-AI08-78ET-44802 ..... N85-27488
DE-AS05-76ER-04936 ..... N85-27652
N85-27660
DE-AS05-81ER-10993 ..... N85-27395
DE-AT03-81ER-10843 ..... N85-27620
DE-FG01-80CS-15027 ..... N85-27180
DE-FG05-80ET-53088 ..... N85-27694
DE-FG05-84ER-45075 ..... N85-26969
DE-FG41-80R1-10354 ..... N85-26766
DEAC02-78ER-10107 ..... N85-26971
DEN3-244 ..... N85-27377
DEN3-348 ..... N85-26994
DI-2-07-81-V0256 ..... N85-27501
DI-14-12-0001-29037 ..... N85-27405
DRET-80/078 ..... N85-27648
DRET-81-634 ..... N85-26676
DRET-81/626 ..... N85-27674
DRET-83-34-133 ..... N85-26932
DRET-83-34-134 ..... N85-26719
DRET-83-1080 ..... N85-26718
DRET-83-1145 ..... N85-27531
DRET-83/34.123 ..... N85-26690
DTCA-STPA-81.95003 ..... N85-27216
DTFA-01-81-C-10057 ..... N85-26761
EPA-68-02-3696 ..... N85-26955
EPRI PROJ. 2370-2 ..... N85-27438
FG02-84ER-45086 ..... N85-27004
FMV-FINK-82223-80-001-21-001 ..... N85-26674
FMV-FLYGFL-82223-80-001-21-001 ..... N85-26675
FMV-FLYGFL-82223-81-158-25-001 ..... N85-27277
F59-551 ..... N85-27671
F59-552 ..... N85-27605
F66-512 ..... N85-26966
F04611-82-C-0029 ..... N85-26915
F04701-83-C-0084 ..... N85-27110
F19628-85-C-0002 ..... N85-27672
F33615-78-C-2023 ..... N85-26998
F33615-80-C-3226 ..... N85-27027
F33615-81-C-2035 ..... N85-26998
F33615-83-C-3000 ..... N85-26929
F33615-83-C-3409 ..... N85-26701
F33615-84-C-0606 ..... N85-27131
N85-27134
F49620-82-C-0009 ..... N85-27602
F49620-82-C-0062 ..... N85-26942
F49620-83-C-0022 ..... N85-27174
F49620-84-C-0006 ..... N85-27842
F49620-84-C-0104 ..... N85-27211
F65559 ..... N85-27013
INAG-84-CO-039 ..... N85-27717
JPL-955376 ..... N85-27428
JPL-955931 ..... N85-27360
JPL-956322 ..... N85-26768
JPL-956427 ..... N85-27324
JPL-956571 ..... N85-27259
JPL-956616 ..... N85-27382
JPL-956622 ..... N85-27091
JPL-956632 ..... N85-26938
JPL-956656 ..... N85-27669
JPL-956689 ..... N85-27295
N85-27296
N85-27297
N85-27298
N85-27299
JPL-956697 ..... N85-27361
JPL-956753 ..... N85-27090
JPL-956904 ..... N85-26949
MA-06-0120 ..... N85-27773
MIPR-80-939-5 ..... N85-27534
NAGW-26 ..... N85-27509
NAGW-218 ..... N85-26971
NAGW-587 ..... N85-27775
NAG1-145 ..... N85-27257
NAG1-178 ..... N85-27207
NAG1-225 ..... N85-26950

NAG1-270 N85-27589
NAG1-330 N85-28665
NAG1-343 N85-26927
NAG1-391 N85-27542
N85-27582
NAG1-399 N85-26961
NAG1-506 N85-27589
NAG2-66 N85-27413
NAG2-229 N85-26989
NAG2-273 N85-27543
NAG3-74 N85-26716
N85-26717
NAG3-160 N85-27263
NAG3-201 N85-27164
NAG3-271 N85-26962
NAG3-379 N85-27260
NAG3-466 N85-27168
NAG3-593 N85-26712
NAG5-94 N85-27425
NAG5-411 N85-27775
NAG5-456 N85-27423
NAG5-629 N85-27785
NAG10-13 N85-26853
NASA ORDER L-67978-B N85-27466
NASA ORDER W-15519 N85-27819
N85-27820
NASW-3061 N85-27415
NASW-3242 N85-27414
NASW-3455 N85-26610
NASW-3607 N85-26936
NASW-3924 N85-27517
NASW-3949 N85-27468
NASW-3950 N85-27781
NASW-4003 N85-26610
N85-26851
NAS1-.616909 N85-26861
NAS1-14472 N85-27583
NAS1-16147 N85-26710
NAS1-16202 N85-26760
NAS1-17423 N85-26759
NAS1-17656 N85-26913
NAS1-17758 N85-26844
N85-26845
NAS2-10650 N85-26691
NAS2-11711 N85-26864
NAS3-22654 N85-27508
NAS3-22769 N85-27012
NAS3-23165 N85-26709
NAS3-23255 N85-27092
NAS3-23293 N85-27164
NAS3-23349 N85-26907
NAS3-23681 N85-26668
NAS3-23686 N85-27584
NAS3-23687 N85-27261
NAS3-23926 N85-26711
NAS5-22929 N85-27469
NAS5-27888 N85-26769
NAS5-28448 N85-27426
NAS7-100 N85-26837
N85-27089
N85-27324
N85-27388
N85-27426
NAS7-918 N85-26842
NAS8-34505 N85-26895
NAS8-34655 N85-26904
NAS8-34728 N85-26911
NAS8-34733 N85-27463
NAS8-34928 N85-26910
NAS8-35331 N85-27705
NAS8-35597 N85-27467
NAS8-35818 N85-26995
NAS8-36144 N85-27193
NAS8-36148 N85-26925
NAS8-36160 N85-26854
NAS8-36288 N85-27284
NAS9-15421 N85-27320
N85-27322
NAS9-16893 N85-26841
NA80AA-D-00038 N85-27405
NCA2-IR390-403 N85-27589
NCC2-135 N85-27518
NCC2-297 N85-27262
NGL-33-015-141 N85-27782
NGL50-002-044 N85-27813
NIH-N01-AL-15547 N85-27131
N85-27134
NIH-N01-ES-03239 N85-27131
N85-27134
NR PROJ. SRO-159 N85-27594
NSF ATM-83-1491 N85-27819
NSF ATM-831491 N85-27820
NSF MCS-81-00748 N85-27802
NSF MCS-81-08181 N85-27571
NSF MCS-82-00269 N85-27539
NSF OCE-82-15708 N85-27505
NSG-1588 N85-27206
NSG-2412 N85-27783
NSG-3048 N85-26713
N85-26714
N85-26715
NSG-3196 N85-27637
NSG-5265 N85-27424
NSG-5351 N85-27426
NSG-7499 N85-27782
NTNF-1810.7890 N85-27344
N00014-75-C-0867 N85-27637
N00014-76-C-0408 N85-26999
N85-27267
N00014-77-C-0378 N85-27579
N00014-79-C-0415 N85-27650
N00014-79-C-0683 N85-26997
N00014-80-C-0472 N85-27719
N00014-80-C-0647 N85-27539
N85-27608
N85-27630
N00014-80-C-0741 N85-27553
N00014-81-K-0146 N85-27124
N85-27607
N00014-81-K-0340 N85-27620
N00014-81-K-0759 N85-27648
N00014-82-C-0019 N85-27505
N00014-82-C-0672 N85-27170
N00014-82-K-0025 N85-27269
N00014-82-K-0113 N85-26946
N00014-82-K-0184 N85-27172
N85-27556
N85-27571
N85-27598
N85-27641
N85-27708
N00014-82-K-0412 N85-27629
N00014-82-K-0529 N85-27212
N00014-82-K-0612 N85-27000
N00014-83-C-0025 N85-27746
N00014-83-K-0143 N85-26928
N00014-83-K-0147 N85-27595
N00014-83-K-0258 N85-27369
N00014-84-C-0163 N85-27520
N00014-84-C-0632 N85-27709
N00014-84-C-0697 N85-26965
N00014-84-C-0727 N85-27198
N00014-84-K-0010 N85-27001
N00014-84-K-0027 N85-27266
N00014-84-K-0049 N85-27594
N00014-84-K-0574 N85-27637
N00019-81-C-0395 N85-26703
N85-26725
N85-26726
N85-26727
N00019-84-C-0123 N85-26703
N85-26725
N85-26726
N85-26727
N00024-83-C-5301 N85-27336
N00039-81-C-0361 N85-27120
OSURF PROJ. 711055 N85-27424
PBE-90753.140 N85-27188
RR0-1107 N85-27212
RR0-1411 N85-27149
RR0-2208 N85-27149
STPA-83/95013 N85-26678
STPA-83/95030 N85-26679
STPA-8395017 N85-26677
STW-DRL11.0120 N85-27188
S0400 N85-27013
W-31-109-ENG-38 N85-26916
N85-26978
N85-27396
N85-27562
N85-27565
N85-27653
N85-27663
N85-27710
W-7405-ENG-26 N85-27260
N85-27682
W-7405-ENG-36 N85-26770
N85-26972
N85-27003
N85-27019
N85-27152
N85-27179
N85-27202
N85-27214
N85-27215
N85-27271
N85-27611
N85-27654
N85-27664
N85-27682
N85-27683
N85-27692
N85-27788
N85-27789
N85-27791
N85-27793
W-7405-ENG-48 N85-26952
N85-26953
N85-27020
N85-27125
N85-27156
N85-27157
N85-27213
N85-27232
N85-27275
N85-27487
N85-27563
N85-27572
N85-27656
N85-27657
N85-27673
N85-27687
N85-27688
N85-27691
W-7405-ENG-82 N85-27712
W05-13 N85-27484
141-20-17 N85-27387
188-41-23-01 N85-27528
199-22-76-01 N85-27665
503-43-11 N85-26671
505-31-01 N85-27167
505-31-21 N85-26672
505-31-42 N85-27012
505-32-52 N85-27165
505-33-1B N85-26962
N85-26993
505-33-13-01 N85-26961
505-33-62 N85-26963
505-33-72 N85-27226
505-34-13-32 N85-27616
505-42-23-03 N85-26924
505-42-41 N85-26691
505-42-94 N85-27227
505-43-52 N85-26710
505-45-13-01 N85-26687
505-45-33 N85-26705
N85-26760
505-45-43-05 N85-26667
506-53-1B N85-26991
506-54-63-01 N85-27575
506-55-62 N85-26912
506-55-72 N85-26921
N85-26992
506-62-23-01 N85-26844
N85-26845
533-04-1A N85-26716
N85-26717
533-04-12 N85-27264
533-14-12 N85-27260
534-06-13 N85-26923
535-05-12 N85-26670
619-12-30-01 N85-27486
665-10-40-04 N85-27422
776-33-41 N85-27385
776-54-01 N85-27386
992-21-01-90-01 N85-27258

REPORT / ACCESSION NUMBER INDEX

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-9833 ..... N85-27258* #

AD-A149222 ..... N85-27594 #
AD-A150599 ..... N85-27480 #
AD-A151166 ..... N85-27110 #
AD-A151662 ..... N85-27111 #
AD-A151683 ..... N85-27533 #
AD-A151689 ..... N85-27623 #
AD-A151721 ..... N85-27736 #
AD-A151722 ..... N85-27739 #
AD-A151723 ..... N85-27740 #
AD-A151724 ..... N85-27741 #
AD-A151725 ..... N85-26928 #
AD-A151730 ..... N85-27638 #
AD-A151731 ..... N85-27208 #
AD-A151732 ..... N85-27595 #
AD-A151736 ..... N85-27629 #
AD-A151741 ..... N85-27369 #
AD-A151744 ..... N85-26939 #
AD-A151757 ..... N85-26940 #
AD-A151761 ..... N85-26833 #
AD-A151763 ..... N85-27648 #
AD-A151765 ..... N85-27209 #
AD-A151766 ..... N85-27112 #
AD-A151770 ..... N85-27536 #
AD-A151771 ..... N85-26722 #
AD-A151772 ..... N85-27779 #
AD-A151774 ..... N85-27742 #
AD-A151777 ..... N85-27596 #
AD-A151782 ..... N85-27537 #
AD-A151783 ..... N85-27546 #
AD-A151784 ..... N85-26857 #
AD-A151794 ..... N85-26858 #
AD-A151796 ..... N85-27649 #
AD-A151799 ..... N85-27265 #
AD-A151800 ..... N85-27520 #
AD-A151802 ..... N85-27197 #
AD-A151807 ..... N85-27170 #
AD-A151812 ..... N85-27568 #
AD-A151813 ..... N85-27538 #
AD-A151814 ..... N85-26941 #
AD-A151817 ..... N85-27547 #
AD-A151824 ..... N85-26914 #
AD-A151825 ..... N85-27113 #
AD-A151909 ..... N85-26888 #
AD-A151910 ..... N85-27529 #
AD-A151911 ..... N85-27743 #
AD-A151913 ..... N85-26997 #
AD-A151916 ..... N85-27521 #
AD-A151917 ..... N85-26708 #
AD-A151918 ..... N85-27576 #
AD-A151919 ..... N85-27114 #
AD-A151921 ..... N85-26634 #
AD-A151923 ..... N85-26707 #
AD-A151925 ..... N85-27744 #
AD-A151926 ..... N85-27171 #
AD-A151927 ..... N85-26839 #
AD-A151928 ..... N85-27115 #
AD-A151929 ..... N85-27116 #
AD-A151933 ..... N85-27577 #
AD-A151934 ..... N85-27597 #
AD-A151935 ..... N85-27569 #
AD-A151936 ..... N85-27117 #
AD-A151937 ..... N85-27118 #
AD-A151938 ..... N85-27534 #
AD-A151940 ..... N85-26893 #
AD-A151944 ..... N85-27481 #
AD-A151946 ..... N85-26723 #
AD-A151947 ..... N85-27570 #
AD-A151949 ..... N85-26894 #
AD-A151950 ..... N85-27522 #
AD-A151953 ..... N85-27172 #
AD-A151954 ..... N85-27618 #
AD-A151955 ..... N85-27619 #
AD-A151956 ..... N85-27548 #
AD-A151958 ..... N85-27210 #
AD-A151959 ..... N85-27211 #
AD-A151960 ..... N85-27523 #
AD-A151961 ..... N85-27147 #
AD-A151963 ..... N85-27229 #
AD-A151965 ..... N85-27173 #
AD-A151966 ..... N85-27148 #
AD-A151967 ..... N85-26859 #
AD-A151968 ..... N85-27524 #
AD-A151969 ..... N85-27174 #
AD-A151970 ..... N85-27598 #
AD-A151973 ..... N85-27525 #
AD-A151992 ..... N85-27599 #
AD-A151993 ..... N85-27600 #
AD-A151995 ..... N85-27706 #
AD-A151999 ..... N85-26942 #
AD-A152001 ..... N85-27670 #
AD-A152002 ..... N85-26965 #
AD-A152003 ..... N85-27650 #
AD-A152004 ..... N85-27624 #
AD-A152006 ..... N85-27549 #
AD-A152010 ..... N85-26708 #
AD-A152020 ..... N85-27482 #
AD-A152021 ..... N85-26860 #
AD-A152022 ..... N85-27719 #
AD-A152025 ..... N85-27751 #
AD-A152026 ..... N85-27601 #
AD-A152027 ..... N85-27817 #
AD-A152030 ..... N85-26895 #
AD-A152034 ..... N85-26700 #
AD-A152035 ..... N85-27550 #
AD-A152036 ..... N85-27651 #
AD-A152040 ..... N85-26998 #
AD-A152067 ..... N85-27551 #
AD-A152073 ..... N85-27266 #
AD-A152078 ..... N85-27578 #
AD-A152082 ..... N85-27671 #
AD-A152085 ..... N85-27149 #
AD-A152086 ..... N85-27552 #
AD-A152089 ..... N85-26966 #
AD-A152090 ..... N85-26999 #
AD-A152091 ..... N85-27267 #
AD-A152093 ..... N85-27553 #
AD-A152096 ..... N85-26701 #
AD-A152101 ..... N85-27752 #
AD-A152104 ..... N85-27602 #
AD-A152111 ..... N85-27639 #
AD-A152112 ..... N85-27389 #
AD-A152113 ..... N85-26943 #
AD-A152114 ..... N85-27640 #
AD-A152115 ..... N85-27268 #
AD-A152116 ..... N85-27603 #
AD-A152117 ..... N85-27119 #
AD-A152118 ..... N85-26724 #
AD-A152120 ..... N85-27120 #
AD-A152121 ..... N85-27230 #
AD-A152122 ..... N85-27604 #
AD-A152123 ..... N85-27707 #
AD-A152129 ..... N85-26838 #
AD-A152130 ..... N85-27150 #
AD-A152132 ..... N85-26944 #
AD-A152134 ..... N85-27121 #
AD-A152135 ..... N85-27554 #
AD-A152143 ..... N85-27212 #
AD-A152144 ..... N85-27605 #
AD-A152145 ..... N85-26835 #
AD-A152148 ..... N85-27555 #
AD-A152161 ..... N85-27483 #
AD-A152169 ..... N85-27753 #
AD-A152170 ..... N85-27505 #
AD-A152172 ..... N85-27175 #
AD-A152174 ..... N85-27641 #
AD-A152184 ..... N85-26945 #
AD-A152193 ..... N85-26896 #
AD-A152194 ..... N85-26702 #
AD-A152195 ..... N85-27122 #
AD-A152196 ..... N85-27672 #
AD-A152197 ..... N85-27642 #
AD-A152199 ..... N85-27571 #
AD-A152200 ..... N85-27556 #
AD-A152201 ..... N85-27754 #
AD-A152202 ..... N85-27755 #
AD-A152203 ..... N85-27756 #
AD-A152204 ..... N85-27757 #
AD-A152205 ..... N85-27758 #
AD-A152209 ..... N85-26929 #
AD-A152210 ..... N85-26946 #
AD-A152212 ..... N85-27198 #
AD-A152214 ..... N85-27706 #
AD-A152216 ..... N85-27123 #
AD-A152217 ..... N85-27606 #
AD-A152218 ..... N85-27745 #
AD-A152220 ..... N85-27176 #
AD-A152221 ..... N85-27557 #
AD-A152223 ..... N85-27759 #
AD-A152224 ..... N85-27199 #
AD-A152227 ..... N85-27269 #
AD-A152231 ..... N85-27607 #
AD-A152233 ..... N85-27000 #
AD-A152234 ..... N85-27484 #
AD-A152235 ..... N85-27608 #
AD-A152237 ..... N85-27526 #
AD-A152238 ..... N85-27510 #
AD-A152239 ..... N85-27609 #
AD-A152241 ..... N85-27027 #
AD-A152242 ..... N85-26762 #
AD-A152243 ..... N85-26915 #
AD-A152249 ..... N85-27709 #
AD-A152251 ..... N85-27177 #
AD-A152253 ..... N85-27630 #
AD-A152255 ..... N85-27539 #
AD-A152260 ..... N85-27579 #
AD-A152262 ..... N85-27124 #
AD-A152268 ..... N85-26725 #
AD-A152269 ..... N85-26726 #
AD-A152270 ..... N85-26727 #
AD-A152271 ..... N85-26703 #
AD-A152275 ..... N85-27558 #
AD-A152277 ..... N85-27530 #
AD-A152280 ..... N85-27746 #
AD-A152281 ..... N85-26967 #
AD-A152283 ..... N85-26897 #
AD-A152290 ..... N85-27001 #
AD-A152291 ..... N85-27511 #
AD-A152292 ..... N85-27270 #
AD-A152293 ..... N85-27610 #
AD-A152294 ..... N85-27013 #
AD-A152295 ..... N85-27028 #
AD-A152296 ..... N85-27014 #
AD-A152298 ..... N85-27015 #
AD-A152299 ..... N85-27390 #
AD-A152314 ..... N85-27559 #
AD-A152315 ..... N85-27560 #
AD-A152316 ..... N85-27561 #

AD-D011602 ..... N85-27139
AD-D011603 ..... N85-27191
AD-D011605 ..... N85-27192
AD-D011606 ..... N85-27086
AD-D011607 ..... N85-27087
AD-D011608 ..... N85-27140
AD-D011609 ..... N85-26684
AD-D011610 ..... N85-27011
AD-D011611 ..... N85-26988
AD-D011614 ..... N85-27141
AD-D011616 ..... N85-27376
AD-D011617 ..... N85-27698
AD-D011625 ..... N85-27142
AD-D011626 ..... N85-27143
AD-D011627 ..... N85-27144
AD-D011630 ..... N85-27145
AD-D011631 ..... N85-27146

AD-E301625 ..... N85-27595 #
AD-E301625 ..... N85-27629 #
AD-E401303 ..... N85-26724 #
AD-E401303 ..... N85-26836 #
AD-E401303 ..... N85-26943 #
AD-E401303 ..... N85-27119 #
AD-E401303 ..... N85-27120 #
AD-E401303 ..... N85-27230 #
AD-E401303 ..... N85-27268 #
AD-E401303 ..... N85-27389 #
AD-E401303 ..... N85-27603 #
AD-E401303 ..... N85-27604 #
AD-E401303 ..... N85-27639 #
AD-E401303 ..... N85-27640 #
AD-E401303 ..... N85-27707 #
AD-E440272 ..... N85-27150 #
AD-E700015 ..... N85-27547 #
AD-E750969 ..... N85-27623 #
AD-E751114 ..... N85-26693 #
AD-E751179 ..... N85-27111 #
AD-E751179 ..... N85-27533 #
AD-E801100 ..... N85-26703 #
AD-E801100 ..... N85-26725 #
AD-E801100 ..... N85-26726 #
AD-E801100 ..... N85-26727 #
AD-E850780 ..... N85-27481 #
AD-E850781 ..... N85-27483 #
AD-E900425 ..... N85-27390 #
AD-E900445 ..... N85-27013 #
AD-E950674 ..... N85-27610 #

AD-F300546 ..... N85-26944 #
AD-F300584 ..... N85-26941 #
AD-F300584 ..... N85-27538 #
AD-F300587 ..... N85-27014 #
AD-F300588 ..... N85-27028 #
AD-F300591 ..... N85-27270 #
AD-F300593 ..... N85-27015 #

AD-131523 ..... N85-26987

ADCR-85-1-VOL-1 ..... N85-26725 #
ADCR-85-1-VOL-2 ..... N85-26726 #
ADCR-85-1-VOL-3-PT-1 ..... N85-26727 #
ADCR-85-1-VOL-3-PT-2 ..... N85-26703 #

AFESC/ESL-TR-84-41 ..... N85-26945 #

AFHRL-TP-84-52 ..... N85-27530 #

AFIT/CI/NR-85-17T ..... N85-26694 #
AFIT/CI/NR-85-20T ..... N85-27577 #
AFIT/CI/NR-85-23T ..... N85-26706 #
AFIT/CI/NR-85-24T ..... N85-27114 #
AFIT/CI/NR-85-32D ..... N85-26859 #
AFIT/CI/NR-85-33D ..... N85-26723 #

AFIT/DS/AE/84-2 ..... N85-27268 #

AFIT/DSL/ENG/84J-1 ..... N85-27597 #

AFIT/GA/AA/80M-1 ..... N85-26914 #
AFIT/GA/AA/84D-6 ..... N85-26858 #
AFIT/GA/AA/84D-10 ..... N85-26839 #
AFIT/GA/AA/84D-11 ..... N85-26857 #

AFIT/GA/ENG/84D-1 ..... N85-26693 #

AFIT/GAE/AA/84D-2 ..... N85-27606 #
AFIT/GAE/AA/84D-28 ..... N85-27171 #
AFIT/GAE/AA/84J-2 ..... N85-26724 #

AFIT/GCS/EE/84D-10 ..... N85-27537 #
AFIT/GCS/EE/84D-13 ..... N85-27558 #

AFIT/GCS/ENG/84D-12 ..... N85-27536 #
AFIT/GCS/ENG/84D-14 ..... N85-27552 #
AFIT/GCS/ENG/84S-3 ..... N85-26762 #

AFIT/GE/EE/84D-12 ..... N85-27111 #
AFIT/GE/EE/84D-14 ..... N85-27546 #
AFIT/GE/EE/84D-27 ..... N85-27147 #

AFIT/GE/ENG/84D-14 ..... N85-26702 #
AFIT/GE/ENG/84D-15 ..... N85-26722 #
AFIT/GE/ENG/84D-17-VOL-1 ..... N85-27569 #
AFIT/GE/ENG/84D-17-VOL-2 ..... N85-27570 #
AFIT/GE/ENG/84D-18 ..... N85-27389 #
AFIT/GE/ENG/84D-19 ..... N85-27229 #
AFIT/GE/ENG/84D-23 ..... N85-27526 #
AFIT/GE/ENG/84D-26 ..... N85-27117 #
AFIT/GE/ENG/84D-29 ..... N85-27113 #
AFIT/GE/ENG/84D-53 ..... N85-27576 #
AFIT/GE/ENG/84D-59 ..... N85-27549 #
AFIT/GE/ENG/84D-60 ..... N85-27116 #
AFIT/GE/ENG/84D-62 ..... N85-27118 #
AFIT/GE/ENG/84D-64 ..... N85-27119 #
AFIT/GE/ENG/84D-66 ..... N85-27122 #
AFIT/GE/ENG/84D-68 ..... N85-27536 #
AFIT/GE/ENG/84D-70 ..... N85-27510 #

AFIT/GEO/ENG/84D-3 ..... N85-27596 #

AFIT/GEO/PH/84D-2 ..... N85-26943 #
AFIT/GEO/PH/84D-5 ..... N85-27649 #
AFIT/GEO/PH/84D-6 ..... N85-27640 #

AFIT/GEP/PH/84D-6 ..... N85-27209 #
AFIT/GEP/PH/84D-14 ..... N85-27779 #

AFIT/GOR/OS/84D-6 ..... N85-27618 #
AFIT/GOR/OS/84D-10 ..... N85-27603 #
AFIT/GOR/OS/84D-12 ..... N85-27548 #

AFIT/GSO/ENS/84D-1 ..... N85-26695 #

AFIT/GSO/OS/84D-2 ..... N85-26860 #
AFIT/GSO/OS/84D-8 ..... N85-27743 #
AFIT/GSO/OS/84D-9 ..... N85-27578 #

AFOSR-85-0064TR ..... N85-27265 #
AFOSR-85-0228TR ..... N85-26939 #
AFOSR-85-0242TR ..... N85-27651 #
AFOSR-85-0245TR ..... N85-27524 #
AFOSR-85-0246TR ..... N85-27511 #
AFOSR-85-0250TR ..... N85-26942 #
AFOSR-85-0252TR ..... N85-27174 #
AFOSR-85-0253TR ..... N85-27670 #
AFOSR-85-0256TR ..... N85-27817 #
AFOSR-85-0258TR ..... N85-27210 #
AFOSR-85-0260TR ..... N85-27642 #
AFOSR-85-0264TR ..... N85-27602 #
AFOSR-85-0277TR ..... N85-27211 #
AFOSR-85-0278TR ..... N85-27175 #
AFOSR-85-0280TR-PT-3 ..... N85-27177 #

AFRPL-TR-84-099 ..... N85-26915 #

AFWAL-TR-84-2048 ..... N85-26998 #
AFWAL-TR-84-3066 ..... N85-27027 #
AFWAL-TR-84-3110 ..... N85-26929 #
AFWAL-TR-84-3111 ..... N85-26701 #

AGARD-AG-288 ..... N85-26666 #

AGARD-AR-220 ..... N85-26730 #

AGARD-CP-360 ..... N85-26638 #

AGARD-LS-138 ..... N85-27128 #

AMSMI/RG-84-13-TR ..... N85-27610 #

ANL-84-50 ..... N85-27653 #
ANL-85-8 ..... N85-26916 #

ANL/MCS-TM-41 ..... N85-27562 #
ANL/MCS-TM-46 ..... N85-27565 #

AR-1 ..... N85-27508* #
AR-2 ..... N85-26711* #
AR-5 ..... N85-27388* #
AR-5 ..... N85-27503* #
AR-004-201 ..... N85-26837 #

ARB-R-84-236 ..... N85-27407 #
ARB-R-85/237 ..... N85-27409 #

ARC-TN-1127 ..... N85-26848* #

ARI-RP-203 ..... N85-27198 #

ARL-TR-85-15 ..... N85-27637* #

ARL/STRUC-TM-378 ..... N85-27197 #

ARLCB-TR-85001 ..... N85-27150 #

ARLCD-TR-84030 ..... N85-26838 #

ARO-17603.4-GS ..... N85-26940 #
ARO-18085.10-EL ..... N85-27706 #
ARO-18677.11-PH ..... N85-27208 #
ARO-20846.16-GS ..... N85-27112 #
ARO-21453.1-MA ..... N85-27568 #

ASD-TR-84-5030 ..... N85-26707 #

ASR-1 ..... N85-27261* #

AS147 ..... N85-27501 #
AVSCOM-TR-84-A-5 ..... N85-27258* #
AVSCOM-TR-84-C-14 ..... N85-26709* #
AVSCOM-TR-85-B-1 ..... N85-26924* #

AXIOMATRIX-8409-2 ..... N85-26841* #

BBN-5899 ..... N85-27579 #

BDX-613-3024-REV ..... N85-27029 #
BDX-613-3161R ..... N85-27158 #
BDX-613-3179 ..... N85-26950 #

BLL-BISI-22062-(9022.06) N85-27236

BLL-CE-TRANS-7962-(9022.09) N85-27256
BLL-CE-TRANS-8083-(9022.09) N85-27507
BLL-CE-TRANS-8088-(9022.09) N85-27219

BLL-DOUNREAY-TR-949-(9091.9F) N85-27190

BLL-M-36041-(5828.4) N85-27253
BLL-M-36063-(5828.4) N85-27573
BLL-M-36070-(5828.4) N85-27234
BLL-M-36076-(5828.4) N85-27254
BLL-M-36084-(5828.4) N85-27235
BLL-M-36085-(5828.4) N85-27225
BLL-M-36092-(5828.4) N85-26959
BLL-M-36103-(5828.4) N85-26960
BLL-M-36107-(5828.4) N85-26957
BLL-M-36111-(5828.4) N85-27574
BLL-M-36118-(5828.4) N85-26958

BLL-OA-TRANS-2728-(6196.3) N85-27163

BLL-TRANS-7900-(9022.09) N85-27255

BLL-T6438/BG/LRS/LRST750/85 ..... N85-27632
BLL-T6439/BG/LRS/LRST751/85 ..... N85-27220

BLL-WI-TRANS-682-(9312.57) N85-27221
BLL-WI-TRANS-683-(9312.57) N85-27223

BLL-WI-TRANSL-684-(9312.57) N85-27224

BLM/AK/TR-84/10 ..... N85-27372 #

BMFT-FB-T-84-298 ..... N85-27718 #

BMI/ONWI-504 ..... N85-27370 #

BNL-NUREG-35598 ..... N85-26976 #

BNL-35508 ..... N85-26974 #
BNL-35663 ..... N85-27693 #
BNL-35940 ..... N85-27031 #
BNL-35945 ..... N85-27153 #
BNL-36031 ..... N85-27760 #
BNL-36082 ..... N85-27659 #

BRL-MR-3412 ..... N85-26941 #
BRL-MR-3418 ..... N85-27270 #
BRL-MR-3427 ..... N85-27015 #

BRL-TR-2605-2 ..... N85-26944 #
BRL-TR-2635 ..... N85-27028 #
BRL-TR-2638 ..... N85-27014 #

BR94099 ..... N85-27600 #
BR94355 ..... N85-27599 #

CCMS-85-03 ..... N85-26926 #
CCMS-85-04 ..... N85-26927* #

CE-43 ..... N85-27239
CE-44 ..... N85-27398

CERL-P-85/09 ..... N85-27534 #

CERT-2/6124-04-RO ..... N85-27217 #
CERT-2/6129-00 ..... N85-27717 #

CH-643499-A5 ..... N85-26663

CMA-R06-83 ..... N85-27587 #
CMA-R10-83 ..... N85-27585 #

CN-ISSN-0082-5255 ..... N85-27441 #

CNES-CT/DTI/MS/AE/166 ..... N85-26836 #
CNES-CT/DTI/MS/AE/170 ..... N85-26843 #

CNES-NT-112 ..... N85-27238 #

CONF-840520-29 ..... N85-27662 #
CONF-840570-16 ..... N85-27715 #
CONF-840677-SUMM ..... N85-27151 #

CONF-840753-2 ..... N85-26948 #
CONF-840760-20-REV ..... N85-26983 #
CONF-840767-17 ..... N85-27716 #
CONF-840932-2-REV-1 ..... N85-27687 #
CONF-841005-5 ..... N85-27201 #
CONF-841007-59 ..... N85-27203 #
CONF-841010-15-REV-1 ..... N85-27688 #
CONF-841124-2 ..... N85-26974 #
CONF-841157-83 ..... N85-27714 #
CONF-841157-84 ..... N85-26979 #
CONF-841184-30 ..... N85-26973 #
CONF-841201-29 ..... N85-27273 #
CONF-841218-3-REV-1 ..... N85-27657 #
CONF-841218-22 ..... N85-27202 #
CONF-841218-25 ..... N85-27031 #
CONF-841246-21 ..... N85-26982 #
CONF-841249-5 ..... N85-27760 #
CONF-841257-1 ..... N85-26689 #
CONF-850103-6 ..... N85-26917 #
CONF-850104-2 ..... N85-27018 #
CONF-850106-10 ..... N85-27399 #
CONF-850122-1 ..... N85-27006 #
CONF-850122-2 ..... N85-27007 #
CONF-850122-4 ..... N85-26931 #
CONF-850142-2 ..... N85-26978 #
CONF-850157-1 ..... N85-27684 #
CONF-850265-1 ..... N85-27720 #
CONF-850266-1 ..... N85-27682 #
CONF-850266-2 ..... N85-27683 #
CONF-850310-21 ..... N85-27215 #
CONF-850310-24 ..... N85-27692 #
CONF-850411-4 ..... N85-27611 #
CONF-850411-8 ..... N85-27663 #
CONF-850441-1 ..... N85-26953 #
CONF-850441-2 ..... N85-26952 #
CONF-850450-2 ..... N85-27181 #
CONF-850466-4 ..... N85-27275 #
CONF-850493-1 ..... N85-27272 #
CONF-850580-1 ..... N85-27155 #
CONF-850704-2 ..... N85-27153 #
CONF-8306165-2 ..... N85-26981 #
CONF-8311198-2 ..... N85-27005 #
CONF-8405113 ..... N85-27653 #
CONF-8405155-6 ..... N85-27787 #
CONF-8405231-10 ..... N85-27660 #
CONF-8406139-9-REV-1 ..... N85-27572 #
CONF-8406198-39 ..... N85-27634 #
CONF-8406212-3 ..... N85-27786 #
CONF-8408135-2 ..... N85-27439 #
CONF-8408145-1 ..... N85-27487 #
CONF-8410103-5 ..... N85-27002 #
CONF-8410103-7 ..... N85-26930 #
CONF-8410144-8 ..... N85-27661 #
CONF-8410221-1 ..... N85-27179 #
CONF-8410221-2 ..... N85-26972 #
CONF-8410230-2 ..... N85-27003 #
CONF-8410230-4 ..... N85-27792 #
CONF-8410230-5 ..... N85-27793 #
CONF-8410230-6 ..... N85-27789 #
CONF-8410230-7 ..... N85-26770 #
CONF-8410230-9 ..... N85-27271 #
CONF-8410230-10 ..... N85-27791 #
CONF-8410232-1 ..... N85-27788 #
CONF-8410236-1 ..... N85-27693 #
CONF-8410237-1 ..... N85-27711 #
CONF-8410243-1 ..... N85-27763 #
CONF-8411127-2 ..... N85-26764 #
CONF-8411137-3 ..... N85-27400 #
CONF-8411137-5 ..... N85-27401 #
CONF-8411140-3 ..... N85-27563 #
CONF-8411141-1 ..... N85-26970 #
CONF-8411144-1 ..... N85-27643 #
CONF-8411153-1 ..... N85-27214 #
CONF-8411547-75 ..... N85-27710 #
CONF-8503100-1 ..... N85-27016 #
CONF-8503104-1 ..... N85-27664 #

CSC/SD-84-6055 ..... N85-26769* #

CSIR-S-331 ..... N85-27442 #

CSIR-TWISK-321 ..... N85-27626 #

CU-CS-282-84 ..... N85-27568 #

CWP-008 ..... N85-27594 #

DE84-010568 ..... N85-27761 #
DE84-013679 ..... N85-27151 #
DE85-06550 ..... N85-27031 #
DE85-002704 ..... N85-27653 #
DE85-002913 ..... N85-27713 #
DE85-002926 ..... N85-27018 #
DE85-002929 ..... N85-27394 #
DE85-003227 ..... N85-26952 #
DE85-003622 ..... N85-26953 #
DE85-004057 ..... N85-26974 #
DE85-004798 ..... N85-27002 #
DE85-004916 ..... N85-27690 #
DE85-005089 ..... N85-26917 #
DE85-005239 ..... N85-26930 #
DE85-005251 ..... N85-27400 #
DE85-005255 ..... N85-27401 #
DE85-005272 ..... N85-26973 #
DE85-005370 ..... N85-27201 #
DE85-005493 ..... N85-27155 #
DE85-005520 ..... N85-27272 #
DE85-005530 ..... N85-27643 #
DE85-005561 ..... N85-27179 #
DE85-005571 ..... N85-26689 #
DE85-005588 ..... N85-26970 #
DE85-005729 ..... N85-27611 #
DE85-005795 ..... N85-27029 #
DE85-005813 ..... N85-27721 #
DE85-005855 ..... N85-27685 #
DE85-005902 ..... N85-27664 #
DE85-005961 ..... N85-27214 #
DE85-006021 ..... N85-26766 #
DE85-006105 ..... N85-27016 #
DE85-006118 ..... N85-27663 #
DE85-006300 ..... N85-27438 #
DE85-006306 ..... N85-27030 #
DE85-006320 ..... N85-26975 #
DE85-006454 ..... N85-26980 #
DE85-006485 ..... N85-27274 #
DE85-006497 ..... N85-27656 #
DE85-006537 ..... N85-27181 #
DE85-006569 ..... N85-26947 #
DE85-006596 ..... N85-26971 #
DE85-006642 ..... N85-27688 #
DE85-006655 ..... N85-27771* #
DE85-006682 ..... N85-27271 #
DE85-006690 ..... N85-27693 #
DE85-006705 ..... N85-27202 #
DE85-006706 ..... N85-26972 #
DE85-006707 ..... N85-27788 #
DE85-006714 ..... N85-27793 #
DE85-006716 ..... N85-26770 #
DE85-006717 ..... N85-27789 #
DE85-006731 ..... N85-27153 #
DE85-006764 ..... N85-27657 #
DE85-006766 ..... N85-27275 #
DE85-006771 ..... N85-27513 #
DE85-006788 ..... N85-27396 #
DE85-006792 ..... N85-27395 #
DE85-006816 ..... N85-26949 #
DE85-006820 ..... N85-27564 #
DE85-006832 ..... N85-27393 #
DE85-006837 ..... N85-27710 #
DE85-006839 ..... N85-26978 #
DE85-006854 ..... N85-27391 #
DE85-006894 ..... N85-27652 #
DE85-006914 ..... N85-27667 #
DE85-006920 ..... N85-27711 #
DE85-006925 ..... N85-27684 #
DE85-006949 ..... N85-27017 #
DE85-006950 ..... N85-27180 #
DE85-006957 ..... N85-27686 #
DE85-006977 ..... N85-27631 #
DE85-006979 ..... N85-27621 #
DE85-006983 ..... N85-27689 #
DE85-006989 ..... N85-27006 #
DE85-006997 ..... N85-27660 #
DE85-007021 ..... N85-27158 #
DE85-007022 ..... N85-26764 #
DE85-007026 ..... N85-27213 #
DE85-007048 ..... N85-27178 #
DE85-007057 ..... N85-26950 #
DE85-007073 ..... N85-26979 #
DE85-007074 ..... N85-27634 #
DE85-007106 ..... N85-27273 #
DE85-007111 ..... N85-27694 #
DE85-007131 ..... N85-27485 #
DE85-007144 ..... N85-27388* #
DE85-007213 ..... N85-27673 #
DE85-007223 ..... N85-27003 #
DE85-007228 ..... N85-27687 #
DE85-007230 ..... N85-27563 #
DE85-007233 ..... N85-26948 #
DE85-007234 ..... N85-27792 #
DE85-007238 ..... N85-27620 #
DE85-007241 ..... N85-27562 #
DE85-007244 ..... N85-27125 #
DE85-007251 ..... N85-27487 #
DE85-007272 ..... N85-26951 #
DE85-007303 ..... N85-26785 #
DE85-007339 ..... N85-26916 #
DE85-007341 ..... N85-26969 #
DE85-007349 ..... N85-27392 #
DE85-007377 ..... N85-27019 #
DE85-007382 ..... N85-27654 #
DE85-007386 ..... N85-27152 #
DE85-007412 ..... N85-27572 #
DE85-007452 ..... N85-27157 #
DE85-007453 ..... N85-27156 #
DE85-007470 ..... N85-26962 #
DE85-007490 ..... N85-27370 #
DE85-007509 ..... N85-26763 #
DE85-007511 ..... N85-27655 #
DE85-007543 ..... N85-27715 #
DE85-007546 ..... N85-26983 #
DE85-007547 ..... N85-27662 #
DE85-007548 ..... N85-27005 #
DE85-007549 ..... N85-27716 #
DE85-007550 ..... N85-27007 #
DE85-007555 ..... N85-27439 #
DE85-007559 ..... N85-27695 #
DE85-007566 ..... N85-27399 #
DE85-007569 ..... N85-27585 #
DE85-007596 ..... N85-27540 #
DE85-007605 ..... N85-27658 #
DE85-007613 ..... N85-27714 #
DE85-007616 ..... N85-27763 #
DE85-007623 ..... N85-27659 #
DE85-007624 ..... N85-27203 #
DE85-007629 ..... N85-27661 #
DE85-007630 ..... N85-27712 #
DE85-007659 ..... N85-26981 #
DE85-007661 ..... N85-27682 #
DE85-007680 ..... N85-27215 #
DE85-007699 ..... N85-27683 #
DE85-007700 ..... N85-27791 #
DE85-007710 ..... N85-27692 #
DE85-007714 ..... N85-26968 #
DE85-007729 ..... N85-26977 #
DE85-007751 ..... N85-26931 #
DE85-007755 ..... N85-27154 #
DE85-007761 ..... N85-27004 #
DE85-007790 ..... N85-27722 #
DE85-007797 ..... N85-27612 #
DE85-007826 ..... N85-27635 #
DE85-007830 ..... N85-27723 #
DE85-007834 ..... N85-27787 #
DE85-007863 ..... N85-27486 #
DE85-007925 ..... N85-27760 #
DE85-008006 ..... N85-27772 #
DE85-008053 ..... N85-27786 #
DE85-008119 ..... N85-27691 #
DE85-008147 ..... N85-27696 #
DE85-008172 ..... N85-27720 #
DE85-008262 ..... N85-27231 #
DE85-008324 ..... N85-27020 #
DE85-008343 ..... N85-27488 #
DE85-008397 ..... N85-27200 #

DGLR-84-087 ..... N85-27736

DM-43 ..... N85-27440 #

DOD-5000.12-M-PT-1 ..... N85-27754 #
DOD-5000.12-M-PT-2 ..... N85-27755 #
DOD-5000.12-M-PT-3 ..... N85-27756 #
DOD-5000.12-M-PT-4 ..... N85-27757 #
DOD-5000.12-M-PT-5 ..... N85-27758 #

DOE/CE-0113 ..... N85-27392 #
DOE/CE-50071/1 ..... N85-27017 #

DOE/CS-15027/T1 ..... N85-27180 #

DOE/ER-04936/10 ..... N85-27652 #
DOE/ER-10993/1 ..... N85-27395 #
DOE/ER-13094/T1 ..... N85-27513 #
DOE/ER-13095/T1 ..... N85-26949 #
DOE/ER-40036/T2 ..... N85-27721 #
DOE/ER-40048/2-P4 ..... N85-27635 #
DOE/ER-40048/07-P4 ..... N85-27723 #
DOE/ER-40048/12-P4 ..... N85-27787 #
DOE/ER-40048/29-P4 ..... N85-27612 #
DOE/ER-40048/39-P4 ..... N85-27722 #
DOE/ER-45007/1 ..... N85-27667 #
DOE/ER-45075/1 ..... N85-26969 #
DOE/ER-45086/4 ..... N85-27004 #

DOE/ES-10107/25 ..... N85-26971 #

DOE/ET-13591/1 ..... N85-27274 #
DOE/ET-51013/124 ..... N85-27690 #
DOE/ET-53088/165 ..... N85-27694 #

DOE/EV-10739/2 ..... N85-27486 #

DOE/JPL-954929-84-11 ..... N85-27388* #
DOE/JPL-956333-1 ..... N85-27384* #
DOE/JPL-956525-8517 ..... N85-27383* #
DOE/JPL-956816-85/4 ..... N85-27382* #
DOE/JPL-956879-84/5 ..... N85-27381* #
DOE/JPL-9565711-85/02 ..... N85-27259* #

DOE/NASA/0346-1 ..... N85-26994* #
DOE/NASA/1005-5 ..... N85-27769* #
DOE/NASA/12726-25 ..... N85-27387* #
DOE/NASA/20320-64 ..... N85-27385* #
DOE/NASA/20485-18 ..... N85-27386* #

DOE/NBM-5006788 ..... N85-27396 #

DOE/NV-10320/2 ..... N85-27771* #

DOE/PC-70028/T1 ..... N85-26947 #

DOE/R1-10354/T1 ..... N85-26766 #

DOE/SF-11905/T1 ..... N85-27030 #

DOE/TIC-7000/R6 ..... N85-27761 #

DOT-TSC-UMTA-84-31 ..... N85-27773 #

DOUGLAS-PAPER-7551 ..... N85-26710* #

DPST-84-276 ..... N85-27231 #

DRD-SE-2 ..... N85-27384* #
DRD-SE-7 ..... N85-27383* #
DRD-SE-7 ..... N85-27388* #

DREO-TN-84-17 ..... N85-27522 #

DRL-184 ..... N85-27384* #
DRL-198 ..... N85-27383* #

E-1971 ..... N85-27164* #
E-1980 ..... N85-27165* #
E-2397 ..... N85-26963* #
E-2441 ..... N85-26921* #
E-2483 ..... N85-26991* #
E-2498 ..... N85-27386* #
E-2514 ..... N85-26964* #
E-2530 ..... N85-27385* #
E-2546 ..... N85-26670* #
E-2549 ..... N85-27227* #
E-2559 ..... N85-27228* #
E-2562 ..... N85-27226* #
E-2571 ..... N85-27264* #
E-2572 ..... N85-26912* #
E-2580 ..... N85-26992* #
E-2584 ..... N85-27769* #
E-2590 ..... N85-27387* #
E-2592 ..... N85-26993* #
E-2595 ..... N85-26710* #

EDR-11683 ..... N85-26709* #

EGG-SE-6743 ..... N85-27772 #

EP-212 ..... N85-26767* #

EPA-450/3-84-014 ..... N85-27406 #
EPA-600/D-84-291 ..... N85-27403 #
EPA-600/D-85-010 ..... N85-27527 #
EPA-600/D-895-017 ..... N85-27033 #
EPA-600/M-85-006 ..... N85-26955 #
EPA-600/M-85-007 ..... N85-27541 #
EPA-600/1-85-005 ..... N85-27512 #
EPA-600/3-84-063-PT-2 ..... N85-27408 #
EPA-600/7-84-097 ..... N85-27410 #

EPRI-EA-3839 ..... N85-27438 #

ESA-SP-1070 ..... N85-26771 #

ESA-TT-876 ..... N85-26635 #
ESA-TT-882 ..... N85-26636 #
ESA-TT-884 ..... N85-26637 #

ESD-TR-84-285 ..... N85-27672 #

ESG-1 ..... N85-27495 #

ESL-713656-4 ..... N85-27089* #
ESL-713774-3-VOL-2 ..... N85-26940 #

ETL-0376 ..... N85-27753 #

E85-10097 ..... N85-27318* #
E85-10098 ..... N85-27319* #
E85-10099 ..... N85-27320* #
E85-10101 ..... N85-27321* #
E85-10102 ..... N85-27322* #

FAA-PM-85-5 ..... N85-26761 #

FEHA-84-08-01 ..... N85-26842* #

FFA-TN-1983-23 ..... N85-26674 #
FFA-TN-1984-04 ..... N85-26675 #
FFA-TN-1984-52 ..... N85-27277 #

FISH/WILDLIFE-LEAFLET-1 ..... N85-27402 #

FNAL-84/114 ..... N85-27655 #

FWS/OBS-82/06 ..... N85-27404 #

GEPP-TIS-858A ..... N85-27154 #

GPO-35-520 ..... N85-26685 #
GPO-38-660 ..... N85-27766 #
GPO-38-684 ..... N85-26855 #
GPO-39-395 ..... N85-27767 #
GPO-44-199 ..... N85-27765 #
GPO-47-235 ..... N85-27768 #

GRI-84/0069 ..... N85-27373 #

GWU/IMSE/SERIAL-T-493/84 ..... N85-27629 #

H-1285 ..... N85-26699* #

HEDL-SA-3149-FP ..... N85-26982 #

HTKK-MAT-A227 ..... N85-27613 #

IA-9683-MS ..... N85-27654 #

IAP-TR-83-7 ..... N85-26915 #

ICASE-81-11 ..... N85-27583* #

ICD-2-1-M001 ..... N85-26840* #

IFSR-165 ..... N85-27694 #

IL/ENR/AE-85/01 ..... N85-27397 #

INPE-3087-TDL/162-VOL-2 ..... N85-27326
INPE-3129-PRE/520-PT-1 ..... N85-27428 #
INPE-3130-PRE/521-VOL-2 ..... N85-27429 #
INPE-3159-PRE/533 ..... N85-27770 #
INPE-3190-PRE/554 ..... N85-27430 #
INPE-3215-PRE/568 ..... N85-27474 #
INPE-3216-PRE/569 ..... N85-27330 #
INPE-3278-PRE/601 ..... N85-27666 #
INPE-3291-PRE/606 ..... N85-27675 #
INPE-3296-PRE/611 ..... N85-27327 #
INPE-3314-PRE/621 ..... N85-27329 #
INPE-3315-PRE/622 ..... N85-27328 #
INPE-3322-RPE/468 ..... N85-27321* #
INPE-3323-PRE/623 ..... N85-27318* #
INPE-3349-PRE/628 ..... N85-27475 #
INPE-3350-PRE/659 ..... N85-27519 #
INPE-3352-PRE/631 ..... N85-27590 #
INPE-3355-PRE/633 ..... N85-27544 #
INPE-3358-PRE/634 ..... N85-27814 #
INPE-3359-PRE/637 ..... N85-27545 #
INPE-3360-PRE/638 ..... N85-27431 #
INPE-3378-PRE/653 ..... N85-27435 #
INPE-3384-RPE/470 ..... N85-27479 #
INPE-3386-PRE/657 ..... N85-27319* #
INPE-3387-PRE/658 ..... N85-27591 #
INPE-3393-PRE/664 ..... N85-26856 #
INPE-3395-PRE/665 ..... N85-27703 #
INPE-3398-PRE/667 ..... N85-27436 #
INPE-3406-PRE/675 ..... N85-27702 #
INPE-3412-PRE/678 ..... N85-27476 #
INPE-3413-PRE/679 ..... N85-27331 #
INPE-3421-PRE/686 ..... N85-27332 #
INPE-3424-PRE/687 ..... N85-27195 #
INPE-3439-PRE/696 ..... N85-27434 #
INPE-3447-PRE/700 ..... N85-27700 #
INPE-3448-PRE/701 ..... N85-27432 #
INPE-3452-PRE/704 ..... N85-27701 #
INPE-3453-PRE/705 ..... N85-27628 #
INPE-3469-PRE/712 ..... N85-27437 #
INPE-3470-PRE/713 ..... N85-27093 #
INPE-3476-PRE/719 ..... N85-27194 #
INPE-3477-PRE/720 ..... N85-27478 #
INPE-3478-PRE/721 ..... N85-27816 #
INPE-3479-PRE/722 ..... N85-27776 #
INPE-3480-PRE/723 ..... N85-27777 #
INPE-3481-PRE/724 ..... N85-27778 #
INPE-3483-PRE/726 ..... N85-27704 #
INPE-3492-PRE/729 ..... N85-27504 #
INPE-3494-PRE/731 ..... N85-27433 #
INPE-3495-PRE/732 ..... N85-27699 #
INPE-3499-PRE/735 ..... N85-27477 #

INTL-CL-B64D-17/64 ..... N85-26663

IPPJ-713 ..... N85-27676 #
IPPJ-714 ..... N85-27681 #
IPPJ-715 ..... N85-27677 #
IPPJ-716 ..... N85-27678 #
IPPJ-717 ..... N85-27679 #
IPPJ-718 ..... N85-27680 #

IR-49 ..... N85-26927* #

IS-T-1119 ..... N85-27712 #

ISBN-3-88135-156-6 ..... N85-27794
ISBN-92-835-0373-2 ..... N85-26638 #
ISBN-92-835-1486-6 ..... N85-26666 #
ISBN-92-835-1493-9 ..... N85-26730 #
ISBN-92-835-1494-7 ..... N85-27128 #
ISBN-951-38-2005-X ..... N85-27276 #
ISBN-951-38-2167-6 ..... N85-27668 #
ISBN-951-41-0500-1 ..... N85-27625 #
ISBN-951-697-201-2 ..... N85-27473 #
ISBN-951-753-375-6 ..... N85-27613 #

ISL-CO-212/83 ..... N85-27182 #
ISL-CO-222/83 ..... N85-27183 #
ISL-CO-224/83 ..... N85-27489 #
ISL-CO-225/83 ..... N85-27490 #
ISL-CO-234/83 ..... N85-27644 #
ISL-CO-238/83 ..... N85-27204 #

ISL-NB-402/83 ..... N85-27216 #

ISL-R-102/83 ..... N85-27196 #
ISL-R-103/83 ..... N85-27021 #
ISL-R-113/83 ..... N85-27233 #
ISL-R-114/83 ..... N85-27645 #
ISL-R-115/83 ..... N85-27184 #
ISL-R-116/83 ..... N85-27674 #
ISL-R-117/83 ..... N85-27646 #
ISL-R-122/83 ..... N85-27032 #
ISL-R-126/83 ..... N85-27185 #

ISSN-0038-0911 ..... N85-27819 #
ISSN-0039-6566 ..... N85-26771 #
ISSN-0208-5658 ..... N85-26956
ISSN-0208-5658 ..... N85-27082
ISSN-0208-5658 ..... N85-27083
ISSN-0208-5658 ..... N85-27084
ISSN-0208-5658 ..... N85-27240
ISSN-0208-5658 ..... N85-27241
ISSN-0208-5658 ..... N85-27242
ISSN-0208-5658 ..... N85-27243
ISSN-0208-5658 ..... N85-27244
ISSN-0208-5658 ..... N85-27245
ISSN-0208-5658 ..... N85-27581
ISSN-0289-260X ..... N85-26611 #
ISSN-0340-7608 ..... N85-27718 #
ISSN-0349-0467 ..... N85-27440 #
ISSN-0349-2656 ..... N85-27697 #
ISSN-0355-0087 ..... N85-27625 #
ISSN-0355-1717 ..... N85-27473 #
ISSN-0355-8126 ..... N85-27613 #
ISSN-0358-5069 ..... N85-27276 #
ISSN-0358-5077 ..... N85-27668 #
ISSN-0385-7719 ..... N85-27022 #
ISSN-0469-4236 ..... N85-27357 #

JM/85-6 ..... N85-26712* #

JPL-TDA-PR-42-81 ..... N85-27094* #

JPL-9950-979 ..... N85-27089* #
JPL-9950-1059 ..... N85-26937* #
JPL-9950-1061 ..... N85-26842* #
JPL-9950-1064 ..... N85-26848* #
JPL-9950-1065 ..... N85-26768* #
JPL-9950-1084 ..... N85-27382* #
JPL-9950-1086 ..... N85-26849* #
JPL-9950-1087 ..... N85-27090* #
JPL-9950-1088 ..... N85-27166* #
JPL-9950-1091 ..... N85-27464* #
JPL-9950-1097 ..... N85-27669* #
JPL-9950-1098 ..... N85-27465* #

JPRS-CST-85-012 ..... N85-27300 #

JPRS-ESA-84-032 ..... N85-26833 #
JPRS-ESA-85-019 ..... N85-27077 #

JPRS-UEQ-84-006 ..... N85-27035 #

JPRS-UES-85-005 ..... N85-27307 #

JPRS-UMM-84-010 ..... N85-27071 #

JPRS-USP-85-004 ..... N85-26772 #

KGI-PREPRINT-071 ..... N85-27697 #

KU-SFB-210/E/4 ..... N85-27186 #

L-15795 ..... N85-26667* #
L-15844 ..... N85-26705* #
L-15875 ..... N85-26687* #
L-15889 ..... N85-27575* #
L-15891 ..... N85-27665* #
L-15942 ..... N85-26924* #
L-15946 ..... N85-26923* #
L-15948 ..... N85-27422* #

LA-UR-84-3902 ..... N85-27611 #
LA-UR-84-4028 ..... N85-27179 #
LA-UR-85-61 ..... N85-27664 #
LA-UR-85-233 ..... N85-27214 #
LA-UR-85-286 ..... N85-27788 #
LA-UR-85-288 ..... N85-26972 #
LA-UR-85-294 ..... N85-27202 #
LA-UR-85-312 ..... N85-27003 #
LA-UR-85-363 ..... N85-27271 #
LA-UR-85-364 ..... N85-27793 #
LA-UR-85-370 ..... N85-27789 #
LA-UR-85-384 ..... N85-26770 #
LA-UR-85-413 ..... N85-27683 #
LA-UR-85-419 ..... N85-27791 #
LA-UR-85-516 ..... N85-27692 #
LA-UR-85-523 ..... N85-27682 #
LA-UR-85-702 ..... N85-27215 #

LA-10207-MS ..... N85-27152 #
LA-10270-MS ..... N85-27019 #

LBL-17872 ..... N85-27203 #
LBL-18150 ..... N85-26948 #
LBL-18742 ..... N85-27634 #
LBL-18773 ..... N85-26979 #
LBL-18798 ..... N85-27564 #
LBL-18814 ..... N85-27763 #
LBL-18846 ..... N85-27661 #
LBL-18921 ..... N85-27714 #
LBL-18943 ..... N85-26961 #

LC-79-640375 ..... N85-27819 #
LC-83-600609 ..... N85-27404 #
LC-84-600257 ..... N85-27374 #
LC-84-601124 ..... N85-27764 #
LC-84-601149 ..... N85-27762 #

M-489 ..... N85-27463* #

MBB-BB-563/84-0 ..... N85-27726
MBB-BB-565/84-O N85-27727

MBB-FE-122/S/PUB/133 ..... N85-27725
MBB-FE-732/S/PUB/154 ..... N85-27730

MBB-LKE-32/S/PUB/143 ..... N85-27729

MBB-UA-753/83-O N85-27734

MBB-UD-416/84-O N85-27731
MBB-UD-421/84-O N85-27737

MBB-UM-1/84-O N85-27735

MBB-UR-706/84-O N85-27733
MBB-UR-717/83-O N85-27732

MBB-UT-11/84-O N85-27736
MBB-UT-21/84-O N85-27728

MIMEO-SER-1571 ..... N85-27602 #

MLM-3224(OP) ..... N85-27792 #

MRC-DA-1150 ..... N85-26998 #

MRL-R-952 ..... N85-26837 #

MTPR-15 ..... N85-26664* #

NADC-84114-60 ..... N85-26688 #

NAL-SP-1 ..... N85-26611 #

NAS 1.15:85729 ..... N85-26673* #
NAS 1.15:86073 ..... N85-27790* #
NAS 1.15:86195 ..... N85-27471* #
NAS 1.15:86196 ..... N85-27472* #
NAS 1.15:86204 ..... N85-27325* #
NAS 1.15:86205 ..... N85-27427* #
NAS 1.15:86208 ..... N85-27285* #
NAS 1.15:86209 ..... N85-27784* #
NAS 1.15:86215 ..... N85-26852* #
NAS 1.15:86348 ..... N85-26687* #
NAS 1.15:86423 ..... N85-27616* #
NAS 1.15:86500 ..... N85-27567* #
NAS 1.15:86659 ..... N85-27526* #
NAS 1.15:86679 ..... N85-27167* #
NAS 1.15:86682 ..... N85-26669* #
NAS 1.15:86686 ..... N85-26720* #
NAS 1.15:86710 ..... N85-26721* #
NAS 1.15:86715 ..... N85-26671* #
NAS 1.15:86724 ..... N85-26672* #
NAS 1.15:86727 ..... N85-26699* #
NAS 1.15:86972 ..... N85-27386* #
NAS 1.15:86986 ..... N85-27385* #
NAS 1.15:86987 ..... N85-26963* #
NAS 1.15:87001 ..... N85-26670* #
NAS 1.15:87006 ..... N85-27227* #
NAS 1.15:87007 ..... N85-26991* #
NAS 1.15:87014 ..... N85-27228* #
NAS 1.15:87015 ..... N85-26921* #
NAS 1.15:87017 ..... N85-27226* #
NAS 1.15:87021 ..... N85-27264* #
NAS 1.15:87022 ..... N85-26964* #
NAS 1.15:87023 ..... N85-26912* #
NAS 1.15:87025 ..... N85-26992* #
NAS 1.15:87028 ..... N85-27769* #
NAS 1.15:87034 ..... N85-27387* #
NAS 1.15:87036 ..... N85-26993* #
NAS 1.15:87039 ..... N85-26710* #
NAS 1.15:87473 ..... N85-26840* #
NAS 1.15:87474 ..... N85-26846* #
NAS 1.15:87475 ..... N85-27169* #
NAS 1.15:87476 ..... N85-26996* #
NAS 1.15:87585 ..... N85-27503* #
NAS 1.19:213 ..... N85-26847* #
NAS 1.19:216 ..... N85-27516* #
NAS 1.21:7011(271) N85-27514*
NAS 1.26:3900 ..... N85-26759* #
NAS 1.26:3901 ..... N85-27463* #
NAS 1.26:168329 ..... N85-27164* #
NAS 1.26:171862 ..... N85-26841* #
NAS 1.26:171863 ..... N85-27322* #
NAS 1.26:171864 ..... N85-27320* #
NAS 1.26:172377 ..... N85-26961* #
NAS 1.26:172481 ..... N85-26861* #
NAS 1.26:172524 ..... N85-26913* #
NAS 1.26:172549 ..... N85-26760* #
NAS 1.26:172579-VOL-1 ..... N85-26844* #
NAS 1.26:172579-VOL-2 ..... N85-26845* #
NAS 1.26:172596 ..... N85-27466* #
NAS 1.26:174662 ..... N85-27092* #
NAS 1.26:174738 ..... N85-26709* #
NAS 1.26:174765 ..... N85-27261* #
NAS 1.26:174776 ..... N85-27584* #
NAS 1.26:174803 ..... N85-26994* #
NAS 1.26:174840 ..... N85-27012* #
NAS 1.26:174849 ..... N85-26668* #
NAS 1.26:174855 ..... N85-27260* #
NAS 1.26:174885 ..... N85-27637* #
NAS 1.26:174900 ..... N85-26962* #
NAS 1.26:174915 ..... N85-26711* #
NAS 1.26:174917 ..... N85-26716* #
NAS 1.26:174918 ..... N85-26717* #
NAS 1.26:175290 ..... N85-26769* #
NAS 1.26:175293 ..... N85-27469* #
NAS 1.26:175612 ..... N85-27318* #
NAS 1.26:175613 ..... N85-27319* #
NAS 1.26:175627 ..... N85-27506* #
NAS 1.26:175664 ..... N85-26853* #
NAS 1.26:175709 ..... N85-27785* #
NAS 1.26:175745 ..... N85-27423* #
NAS 1.26:175748 ..... N85-27783* #
NAS 1.26:175751 ..... N85-27424* #
NAS 1.26:175760 ..... N85-27771* #
NAS 1.26:175762 ..... N85-27782* #
NAS 1.26:175764 ..... N85-27089* #
NAS 1.26:175765 ..... N85-26848* #
NAS 1.26:175766 ..... N85-27262* #
NAS 1.26:175767 ..... N85-27813* #
NAS 1.26:175768 ..... N85-27589* #
NAS 1.26:175769 ..... N85-27364* #
NAS 1.26:175771 ..... N85-27669* #
NAS 1.26:175772 ..... N85-27380* #
NAS 1.26:175773 ..... N85-27381* #
NAS 1.26:175774 ..... N85-26849* #
NAS 1.26:175775 ..... N85-27259* #
NAS 1.26:175776 ..... N85-26938* #
NAS 1.26:175777 ..... N85-27382* #
NAS 1.26:175778 ..... N85-26768* #
NAS 1.26:175779 ..... N85-27383* #
NAS 1.26:175780 ..... N85-26937* #
NAS 1.26:175781 ..... N85-26842* #
NAS 1.26:175782 ..... N85-27485* #
NAS 1.26:175783 ..... N85-27464* #
NAS 1.26:175784 ..... N85-27091* #
NAS 1.26:175785 ..... N85-27324* #
NAS 1.26:175786 ..... N85-27090* #
NAS 1.26:175787 ..... N85-27636* #
NAS 1.26:175788 ..... N85-26665* #
NAS 1.26:175789 ..... N85-27413* #
NAS 1.26:175790 ..... N85-26850* #
NAS 1.26:175792 ..... N85-27166* #
NAS 1.26:175793 ..... N85-26925* #
NAS 1.26:175794 ..... N85-27193* #
NAS 1.26:175795 ..... N85-27263* #
NAS 1.26:175796 ..... N85-27425* #
NAS 1.26:175797 ..... N85-27284* #
NAS 1.26:175801 ..... N85-27206* #
NAS 1.26:175802 ..... N85-26664* #
NAS 1.26:175803 ..... N85-27582* #
NAS 1.26:175804 ..... N85-27207* #
NAS 1.26:175805 ..... N85-27583* #
NAS 1.26:175806 ..... N85-26851* #
NAS 1.26:175808 ..... N85-27517* #
NAS 1.26:175809 ..... N85-27426* #
NAS 1.26:175810 ..... N85-27509* #
NAS 1.26:175811 ..... N85-26712* #
NAS 1.26:175812 ..... N85-27586* #
NAS 1.26:175813 ..... N85-27543* #
NAS 1.26:175814 ..... N85-27542* #
NAS 1.26:175815 ..... N85-27386* #
NAS 1.26:175816 ..... N85-26927* #
NAS 1.26:175825 ..... N85-26610* #
NAS 1.26:175826 ..... N85-27820* #
NAS 1.26:175829 ..... N85-27819 #
NAS 1.26:175830 ..... N85-27321* #
NAS 1.26:175831 ..... N85-26713* #
NAS 1.26:175832 ..... N85-26714* #
NAS 1.26:175833 ..... N85-26715* #
NAS 1.26:175834 ..... N85-27532* #
NAS 1.26:175835 ..... N85-27168* #
NAS 1.26:175836 ..... N85-26669* #
NAS 1.26:175837 ..... N85-27518* #
NAS 1.26:175838 ..... N85-27705* #
NAS 1.26:175839 ..... N85-27377* #
NAS 1.26:175842 ..... N85-27094* #
NAS 1.26:175850 ..... N85-26695* #
NAS 1.26:175851 ..... N85-27468* #
NAS 1.26:175852 ..... N85-27781* #
NAS 1.26:175853 ..... N85-27467* #
NAS 1.26:175854 ..... N85-27775* #
NAS 1.26:175855 ..... N85-26854* #
NAS 1.26:175857 ..... N85-27257* #
NAS 1.26:175858 ..... N85-26936* #
NAS 1.26:175891 ..... N85-27414* #
NAS 1.26:177350 ..... N85-26691* #
NAS 1.55:2372 ..... N85-26862* #
NAS 1.60:2393 ..... N85-26705* #
NAS 1.60:2440 ..... N85-27575* #
NAS 1.60:2441 ..... N85-26924* #
NAS 1.60:2460 ..... N85-27185* #
NAS 1.60:2468 ..... N85-26667* #
NAS 1.60:2470 ..... N85-27258* #
NAS 1.60:2476 ..... N85-26990* #
NAS 1.61:1134 ..... N85-27665* #
NAS 1.61:1141 ..... N85-27422* #
NAS 1.61:1142 ..... N85-26923* #

NASA-CP-2372 ..... N85-26862* #

NASA-CR-3900 ..... N85-26759* #
NASA-CR-3901 ..... N85-27463* #
NASA-CR-168329 ..... N85-27164* #
NASA-CR-171862 ..... N85-26841* #
NASA-CR-171863 ..... N85-27322* #
NASA-CR-171864 ..... N85-27320* #
NASA-CR-172377 ..... N85-26961* #
NASA-CR-172481 ..... N85-26861* #
NASA-CR-172524 ..... N85-26913* #
NASA-CR-172549 ..... N85-26760* #
NASA-CR-172579-VOL-1 ..... N85-26844* #
NASA-CR-172579-VOL-2 ..... N85-26845* #
NASA-CR-172596 ..... N85-27466* #
NASA-CR-174662 ..... N85-27092* #
NASA-CR-174738 ..... N85-26709* #
NASA-CR-174765 ..... N85-27261* #
NASA-CR-174776 ..... N85-27584* #
NASA-CR-174803 ..... N85-26994* #
NASA-CR-174840 ..... N85-27012* #
NASA-CR-174849 ..... N85-26668* #
NASA-CR-174855 ..... N85-27260* #
NASA-CR-174885 ..... N85-27637* #
NASA-CR-174900 ..... N85-26962* #
NASA-CR-174915 ..... N85-26711* #
NASA-CR-174917 ..... N85-26716* #
NASA-CR-174918 ..... N85-26717* #
NASA-CR-175290 ..... N85-26769* #
NASA-CR-175293 ..... N85-27469* #
NASA-CR-175612 ..... N85-27318* #
NASA-CR-175613 ..... N85-27319* #
NASA-CR-175627 ..... N85-27506* #
NASA-CR-175664 ..... N85-26853* #
NASA-CR-175709 ..... N85-27785* #
NASA-CR-175745 ..... N85-27423* #
NASA-CR-175748 ..... N85-27783* #

NASA-CR-175751 ..... N85-27424* #
NASA-CR-175760 ..... N85-27771* #
NASA-CR-175762 ..... N85-27782* #
NASA-CR-175764 ..... N85-27089* #
NASA-CR-175765 ..... N85-26848* #
NASA-CR-175766 ..... N85-27262* #
NASA-CR-175767 ..... N85-27813* #
NASA-CR-175768 ..... N85-27589* #
NASA-CR-175769 ..... N85-27384* #
NASA-CR-175771 ..... N85-27669* #
NASA-CR-175772 ..... N85-27380* #
NASA-CR-175773 ..... N85-27381* #
NASA-CR-175774 ..... N85-26849* #
NASA-CR-175775 ..... N85-27259* #
NASA-CR-175776 ..... N85-26938* #
NASA-CR-175777 ..... N85-27382* #
NASA-CR-175778 ..... N85-26768* #
NASA-CR-175779 ..... N85-27383* #
NASA-CR-175780 ..... N85-26937* #
NASA-CR-175781 ..... N85-26842* #
NASA-CR-175782 ..... N85-27465* #
NASA-CR-175783 ..... N85-27464* #
NASA-CR-175784 ..... N85-27091* #
NASA-CR-175785 ..... N85-27324* #
NASA-CR-175786 ..... N85-27090* #
NASA-CR-175787 ..... N85-27636* #
NASA-CR-175788 ..... N85-26665* #
NASA-CR-175789 ..... N85-27413* #
NASA-CR-175790 ..... N85-26850* #
NASA-CR-175792 ..... N85-27166* #
NASA-CR-175793 ..... N85-26925* #
NASA-CR-175794 ..... N85-27193* #
NASA-CR-175795 ..... N85-27263* #
NASA-CR-175796 ..... N85-27425* #
NASA-CR-175797 ..... N85-27284* #
NASA-CR-175801 ..... N85-27206* #
NASA-CR-175802 ..... N85-26664* #
NASA-CR-175803 ..... N85-27582* #
NASA-CR-175804 ..... N85-27207* #
NASA-CR-175805 ..... N85-27583* #
NASA-CR-175806 ..... N85-26851* #
NASA-CR-175808 ..... N85-27517* #
NASA-CR-175809 ..... N85-27426* #
NASA-CR-175810 ..... N85-27509* #
NASA-CR-175811 ..... N85-26712* #
NASA-CR-175812 ..... N85-27588* #
NASA-CR-175813 ..... N85-27543* #
NASA-CR-175814 ..... N85-27542* #
NASA-CR-175815 ..... N85-27388* #
NASA-CR-175816 ..... N85-26927* #
NASA-CR-175825 ..... N85-26810* #
NASA-CR-175826 ..... N85-27820* #
NASA-CR-175829 ..... N85-27819 #
NASA-CR-175830 ..... N85-27321* #
NASA-CR-175831 ..... N85-26713* #
NASA-CR-175832 ..... N85-26714* #
NASA-CR-175833 ..... N85-26715* #
NASA-CR-175834 ..... N85-27532* #
NASA-CR-175835 ..... N85-27168* #
NASA-CR-175836 ..... N85-26989* #
NASA-CR-175837 ..... N85-27518* #
NASA-CR-175838 ..... N85-27705* #
NASA-CR-175839 ..... N85-27377* #
NASA-CR-175842 ..... N85-27094* #
NASA-CR-175850 ..... N85-26995* #
NASA-CR-175851 ..... N85-27468* #
NASA-CR-175852 ..... N85-27781* #
NASA-CR-175853 ..... N85-27467* #
NASA-CR-175854 ..... N85-27775* #
NASA-CR-175855 ..... N85-26854* #
NASA-CR-175857 ..... N85-27257* #
NASA-CR-175858 ..... N85-26936* #
NASA-CR-175891 ..... N85-27414* #
NASA-CR-177350 ..... N85-26691* #

NASA-EP-213 ..... N85-26847* #
NASA-EP-216 ..... N85-27516* #

NASA-RP-1134 ..... N85-27665* #
NASA-RP-1141 ..... N85-27422* #
NASA-RP-1142 ..... N85-26923* #

NASA-SP-7011(271) N85-27514*

NASA-TM-85729 ..... N85-26673* #
NASA-TM-86073 ..... N85-27790* #
NASA-TM-86195 ..... N85-27471* #
NASA-TM-86196 ..... N85-27472* #
NASA-TM-86204 ..... N85-27325* #
NASA-TM-86205 ..... N85-27427* #
NASA-TM-86208 ..... N85-27285* #
NASA-TM-86209 ..... N85-27784* #
NASA-TM-86215 ..... N85-26852* #
NASA-TM-86348 ..... N85-26687* #
NASA-TM-86423 ..... N85-27616* #
NASA-TM-86500 ..... N85-27567* #
NASA-TM-86659 ..... N85-27528* #
NASA-TM-86679 ..... N85-27167* #
NASA-TM-86682 ..... N85-26669* #
NASA-TM-86686 ..... N85-26720* #
NASA-TM-86710 ..... N85-26721* #
NASA-TM-86715 ..... N85-26671* #
NASA-TM-86724 ..... N85-26672* #
NASA-TM-86727 ..... N85-26699* #
NASA-TM-86972 ..... N85-27386* #
NASA-TM-86986 ..... N85-27385* #
NASA-TM-86987 ..... N85-26963* #
NASA-TM-87001 ..... N85-26670* #
NASA-TM-87006 ..... N85-27227* #
NASA-TM-87007 ..... N85-26991* #
NASA-TM-87014 ..... N85-27228* #
NASA-TM-87015 ..... N85-26921* #
NASA-TM-87017 ..... N85-27226* #
NASA-TM-87021 ..... N85-27264* #
NASA-TM-87022 ..... N85-26964* #
NASA-TM-87023 ..... N85-26912* #
NASA-TM-87025 ..... N85-26992* #
NASA-TM-87028 ..... N85-27769* #
NASA-TM-87034 ..... N85-27387* #
NASA-TM-87036 ..... N85-26993* #
NASA-TM-87039 ..... N85-26710* #
NASA-TM-87473 ..... N85-26840* #
NASA-TM-87474 ..... N85-26846* #
NASA-TM-87475 ..... N85-27169* #
NASA-TM-87476 ..... N85-26996* #
NASA-TM-87565 ..... N85-27503* #

NASA-TP-2393 ..... N85-26705* #
NASA-TP-2440 ..... N85-27575* #
NASA-TP-2441 ..... N85-26924* #
NASA-TP-2460 ..... N85-27165* #
NASA-TP-2468 ..... N85-26667* #
NASA-TP-2470 ..... N85-27258* #
NASA-TP-2476 ..... N85-26990* #

NAVHLTHRSCHC-84-46 ..... N85-27529 #

NAVMAT-P-9494 ..... N85-27744 #

NBS/SP-500/119 ..... N85-27762 #
NBS/SP-680/1 ..... N85-27764 #

NBSIR-84-2875 ..... N85-27633 #
NBSIR-85/3109 ..... N85-27034 #
NBSIR-85/3115 ..... N85-27566 #

NCAR/TN-244-STR ..... N85-27497 #

NEAR-TR-335 ..... N85-27170 #

NOAA-DR-ERL-GFDL-6 ..... N85-27492 #

NOAA-TM-ERL-GLERL-55 ..... N85-27498 #

NOAA-TM-ERL-SEL-69 ..... N85-27818 #
NOAA-TM-ERL-SEL-70 ..... N85-27126 #

NOAA-TM-NESDIS-8 ..... N85-27499 #

NOAA-TM-NMFS-F/NEC-33 ..... N85-27506 #

NOAA-TR-ERL-427 ..... N85-27495 #

NOSC/TD-764-REV-A ..... N85-27671 #

NPS-69-84-008 ..... N85-27176 #
NPS-012-84-002PR ..... N85-27740 #
NPS-012-84-003PR ..... N85-27738 #
NPS-012-84-004PR ..... N85-27739 #

NPS53-84-0007 ..... N85-27484 #
NPS67-84-015 ..... N85-26835 #

NSWC/TR-84-294 ..... N85-26967 #
NSWC/TR-84-326 ..... N85-26966 #

NTIA-84-164 ..... N85-27159 #

NTSB/AAR-85/05 ..... N85-26686 #

NUSC-TR-7299 ..... N85-27149 #

NUSC/TR-7267 ..... N85-27605 #

NWC-TP-6563 ..... N85-27390 #
NWC-TP-6587 ..... N85-27013 #

NYU/DC/TR-7-NEW SERIES-2 ..... N85-26946 #

ONERA-PV-1/8068-GY ..... N85-26677 #

ONERA-RF-86/7154-PY ..... N85-26690 #
ONERA-RT-11/1784-M ..... N85-26932 #
ONERA-RT-12/5115-RY-230-R-231G ..... N85-26679 #
ONERA-RT-16/5108-RY-051 ..... N85-26678 #
ONERA-RT-16/5108-RY-053 ..... N85-26678 #

ONERA-RTS-22/3256-EY ..... N85-26719 #

ORNL-6098 ..... N85-27621 #
ORNL-6118 ..... N85-27631 #

ORNL/FEDC-84/6 ..... N85-27695 #
ORNL/FEDC-84/7 ..... N85-27689 #
ORNL/FEDC-84/9 ..... N85-27696 #

ORNL/TM-9319 ..... N85-27685 #
ORNL/TM-9420 ..... N85-27686 #
ORNL/TM-9436 ..... N85-27658 #

PB85-127421 ..... N85-27764 #
PB85-150985 ..... N85-27506 #
PB85-151041 ..... N85-27405 #
PB85-153831 ..... N85-27372 #
PB85-153906 ..... N85-27406 #
PB85-153948 ..... N85-27492 #
PB85-154672 ..... N85-27402 #
PB85-155703 ..... N85-27404 #
PB85-156065 ..... N85-27494 #
PB85-156834 ..... N85-27512 #
PB85-157386 ..... N85-27033 #
PB85-157469 ..... N85-27773 #
PB85-159424 ..... N85-27502 #
PB85-159747 ..... N85-27495 #
PB85-159937 ..... N85-27403 #
PB85-161248 ..... N85-27527 #
PB85-161578 ..... N85-26955 #
PB85-162063 ..... N85-27407 #
PB85-162477 ..... N85-27410 #
PB85-162501 ..... N85-27127 #
PB85-163095 ..... N85-27501 #
PB85-163137 ..... N85-27397 #
PB85-163541 ..... N85-27126 #
PB85-164572 ..... N85-27500 #
PB85-164986 ..... N85-27159 #
PB85-164994 ..... N85-27499 #
PB85-165009 ..... N85-27498 #
PB85-165066 ..... N85-27818 #
PB85-165637 ..... N85-27497 #
PB85-165835 ..... N85-27541 #
PB85-166049 ..... N85-27409 #
PB85-166080 ..... N85-27408 #
PB85-166478 ..... N85-27374 #
PB85-166593 ..... N85-27819 #
PB85-166601 ..... N85-27820* #
PB85-171114 ..... N85-27373 #
PB85-172278 ..... N85-27496 #
PB85-177905 ..... N85-27566 #
PB85-178002 ..... N85-27034 #
PB85-910405 ..... N85-26686 #

PCRL-FR-84-002 ..... N85-26942 #

PDRC-85-01 ..... N85-27595 #

PFC/RR-84-8 ..... N85-27690 #

PML-1983-173 ..... N85-26918 #
PML-1984-C52-PT-1 ..... N85-27188 #
PML-1984-C63 ..... N85-26919 #
PML-1984-C74 ..... N85-26920 #

PNL-SA-12203 ..... N85-27439 #
PNL-SA-12498 ..... N85-27643 #
PNL-SA-12723 ..... N85-26764 #

PNL-5034 ..... N85-26975 #
PNL-5347 ..... N85-26765 #
PNL-5365 ..... N85-26763 #

PR-11 ..... N85-26995* #

PWA-5928-25 ..... N85-27584* #

QR-3 ..... N85-26854* #
QR-4 ..... N85-27382* #

QTPR-1 ..... N85-26947 #

RADC-TR-85-9 ..... N85-27123 #

RAE-TM-AERO-1980 ..... N85-27600 #

RDA-TR-185500-005 ..... N85-27091* #

REPT-4/1984 ..... N85-26956
REPT-5/1984 ..... N85-27082
REPT-9/1984 ..... N85-27240

REPT-10/1984-SUPPL N85-27241
REPT-11/1984 ..... N85-27083
REPT-12/1984 ..... N85-27581
REPT-14/1984 ..... N85-27084
REPT-15/1984 ..... N85-27245
REPT-16/1984 ..... N85-27242
REPT-17/1984 ..... N85-27244
REPT-18/1984 ..... N85-27243
REPT-85-9F7-LODIS-R1 ..... N85-27709 #
REPT-85-9JDIESL-R1 ..... N85-26994* #
REPT-85B0288 ..... N85-27325* #
REPT-85B0292 ..... N85-27427* #
REPT-85F0220 ..... N85-26852* #
REPT-109 ..... N85-27473 #
REPT-3017/81 ..... N85-26663
REPT-85072 ..... N85-27167* #
REPT-85105 ..... N85-26672* #
REPT-85132 ..... N85-26669* #
REPT-85212 ..... N85-26671* #
REPT-86659 ..... N85-27526* #

RESEARCH/DEVELOPMENT-2 ..... N85-27709 #

RF-4340 ..... N85-27425* #

RFP-TRANS-431 ..... N85-26980 #
RFP-TRANS-436 ..... N85-26968 #

RIC-247 ..... N85-27651 #

RL-1PD-85 ..... N85-27012* #

RR-348 ..... N85-26936* #

RSL-TR-360F ..... N85-27320* #

RSRE-MEMO-3683 ..... N85-27599 #

RU-TR-162-MIAE-F-PT-3 ..... N85-27177 #

R85AEB307 ..... N85-26711* #

S-HRG-98-1064 ..... N85-27767 #
S-HRG-98-1070 ..... N85-26855 #

S-PRT-98-235-PT-3 ..... N85-27765 #

SACLANTCEN-SR-82 ..... N85-27638 #

SAND-83-8035 ..... N85-27379 #
SAND-84-0021C ..... N85-27272 #
SAND-84-0313 ..... N85-27378 #
SAND-84-1143C ..... N85-27273 #
SAND-84-1227 ..... N85-27485 #
SAND-84-1648C ..... N85-27006 #
SAND-84-1890C ..... N85-27016 #
SAND-84-2124 ..... N85-27200 #
SAND-84-2171 ..... N85-27393 #
SAND-84-2665C ..... N85-27155 #
SAND-84-7018 ..... N85-27391 #
SAND-84-22670 ..... N85-26970 #
SAND-85-0118C ..... N85-27181 #

SAR-5 ..... N85-27636* #

SASR-14 ..... N85-27424* #

SD-TR-84-58 ..... N85-27110 #

SERI/STR-211-2440 ..... N85-27713 #

SERI/TP-231-2608 ..... N85-27018 #

SERI/TR-252-1956 ..... N85-27394 #

SGD-484-PT-1 ..... N85-27819 #
SGD-484-PT-2 ..... N85-27820* #

SGR-66 ..... N85-27405 #

SMSRC-7-85 ..... N85-27466* #

SPCC-P4BL-20 ..... N85-26920 #

SR-1 ..... N85-27370 #

SSD-85-0012-3-VOL-1 ..... N85-26644* #
SSD-85-0013-3-VOL-2 ..... N85-26645* #

SSS-R-85-7095 ..... N85-27174 #

ST-AASF-IMD-58 ..... N85-27625 #

SU-GL-3821 ..... N85-27465* #

SU-SLAC-PUB-3387 ..... N85-27786 #

SU-SLAC-PUB-3566 ..... N85-27720 #

SU-SLAC-275 ..... N85-27620 #

TI85-006689 ..... N85-26976 #

TR-ONR-DG-13 ..... N85-27746 #

TR-PTR-85-2 ..... N85-27206* #

TR-3 ..... N85-27001 #
TR-9 ..... N85-27000 #
TR-01-85 ..... N85-27630 #
TR-05-84 ..... N85-27539 #
TR-07-84 ..... N85-27608 #
TR-10 ..... N85-26997 #
TR-16 ..... N85-27607 #
TR-17 ..... N85-27124 #
TR-36 ..... N85-26999 #
TR-37 ..... N85-27267 #
TR-52 ..... N85-27553 #
TR-0084A(5925-05)-1 ..... N85-27110 #

TRITA-NA-8215 ..... N85-27580
TRITA-NA-8308 ..... N85-27587 #
TRITA-NA-8309 ..... N85-27586 #
TRITA-NA-8310 ..... N85-27585 #

TUM-M8404 ..... N85-27088
TUM-M8405 ..... N85-27535

T185-901186 ..... N85-27762 #

UCI-ARTR-84-8 ..... N85-26945 #

UCID-20304 ..... N85-27125 #
UCID-20334 ..... N85-27673 #

UCRL-TRANS-12033 ..... N85-27213 #
UCRL-TRANS-12037 ..... N85-27156 #
UCRL-TRANS-12038 ..... N85-27157 #

UCRL-53591 ..... N85-27020 #
UCRL-53599 ..... N85-27656 #
UCRL-90941-REV-1 ..... N85-27572 #
UCRL-90951-REV-1 ..... N85-27657 #
UCRL-91230-REV-1 ..... N85-27688 #
UCRL-91511-REV-1 ..... N85-27687 #
UCRL-91553 ..... N85-26953 #
UCRL-91758 ..... N85-26952 #
UCRL-92007 ..... N85-27563 #
UCRL-92010 ..... N85-27275 #
UCRL-92062 ..... N85-27691 #
UCRL-92082 ..... N85-27487 #

UMTA-MA-06-0120-84-4 ..... N85-27773 #

UROCHESTER/DC/85/TR-59 ..... N85-27719 #

US-PATENT-APPL-SN-086504 ..... N85-27143
US-PATENT-APPL-SN-142951 ..... N85-27140
US-PATENT-APPL-SN-196506 ..... N85-27145
US-PATENT-APPL-SN-290757 ..... N85-27066
US-PATENT-APPL-SN-340397 ..... N85-27139
US-PATENT-APPL-SN-343644 ..... N85-27142
US-PATENT-APPL-SN-345454 ..... N85-27141
US-PATENT-APPL-SN-382850 ..... N85-27191
US-PATENT-APPL-SN-386465 ..... N85-27011
US-PATENT-APPL-SN-389315 ..... N85-27144
US-PATENT-APPL-SN-395431 ..... N85-27192
US-PATENT-APPL-SN-434998 ..... N85-27146
US-PATENT-APPL-SN-453444 ..... N85-26684
US-PATENT-APPL-SN-471083 ..... N85-27698
US-PATENT-APPL-SN-490695 ..... N85-27067
US-PATENT-APPL-SN-563435 ..... N85-26988
US-PATENT-APPL-SN-573904 ..... N85-27376

US-PATENT-CLASS-148-1.5 ..... N85-27698
US-PATENT-CLASS-244-151 ..... N85-26684
US-PATENT-CLASS-250-227 ..... N85-27191
US-PATENT-CLASS-310-311 ..... N85-27144
US-PATENT-CLASS-310-361 ..... N85-27143
US-PATENT-CLASS-310-361 ..... N85-27145
US-PATENT-CLASS-310-361 ..... N85-27146
US-PATENT-CLASS-331-66 ..... N85-27141
US-PATENT-CLASS-331-158 ..... N85-27142
US-PATENT-CLASS-343-5 ..... N85-27139
US-PATENT-CLASS-343-7.7 ..... N85-27066
US-PATENT-CLASS-350-96.15 ..... N85-27140
US-PATENT-CLASS-350-307 ..... N85-27192
US-PATENT-CLASS-423-644 ..... N85-27011
US-PATENT-CLASS-429-17 ..... N85-27376
US-PATENT-CLASS-455-617 ..... N85-27067
US-PATENT-CLASS-528-299 ..... N85-26988

US-PATENT-4,344,010 ..... N85-27143

US-PATENT-4,365,182 ..... N85-27145
US-PATENT-4,410,822 ..... N85-27144
US-PATENT-4,451,755 ..... N85-27146
US-PATENT-4,453,141 ..... N85-27142
US-PATENT-4,461,485 ..... N85-27141
US-PATENT-4,482,702 ..... N85-26988
US-PATENT-4,483,582 ..... N85-27140
US-PATENT-4,486,657 ..... N85-27191
US-PATENT-4,488,691 ..... N85-26684
US-PATENT-4,489,049 ..... N85-27011
US-PATENT-4,489,320 ..... N85-27066
US-PATENT-4,490,016 ..... N85-27192
US-PATENT-4,492,960 ..... N85-27139
US-PATENT-4,493,114 ..... N85-27067
US-PATENT-4,494,995 ..... N85-27698
US-PATENT-4,495,256 ..... N85-27376

USAAEFA-81-06-1 ..... N85-26708 #

USAAVSCOM-TR-84-C-4 ..... N85-27228* #
USAAVSCOM-TR-85-A-2 ..... N85-26720* #
USAAVSCOM-TR-85-A-3 ..... N85-26669* #
USAAVSCOM-TR-85-C-3 ..... N85-27227* #
USAAVSCOM-TR-85-C-5 ..... N85-26964* #

USAFETAC/DS-81/054 ..... N85-27483 #
USAFETAC/DS-81/058 ..... N85-27481 #
USAFETAC/DS-83/043 ..... N85-27483 #
USAFETAC/DS-84/022 ..... N85-27481 #

USARIEM-M21/85 ..... N85-27523 #
USARIEM-M38/84 ..... N85-27525 #

USARIEM-T-2/85 ..... N85-27521 #

USGS/WRI-84-4328 ..... N85-27488 #

USNA-9 ..... N85-27741 #

UTCMSE-85-1 ..... N85-26928 #

UTEC-ME-85-014 ..... N85-27636* #

UTIAS-271 ..... N85-27441 #

UTRC/R85-926671 ..... N85-27642 #

UVA-ER-970-85U ..... N85-27178 #

VPI-E-85-08 ..... N85-26926 #
VPI-E-85-09 ..... N85-26927* #

VTH-LR-371 ..... N85-27280 #
VTH-LR-386 ..... N85-27278 #
VTH-LR-387 ..... N85-27279 #
VTH-LR-394 ..... N85-26728 #
VTH-LR-395 ..... N85-27614 #
VTH-LR-396 ..... N85-26680 #
VTH-LR-411 ..... N85-26729 #
VTH-LR-412 ..... N85-26681 #
VTH-LR-413 ..... N85-26704 #
VTH-LR-414 ..... N85-26682 #
VTH-LR-415 ..... N85-26916 #
VTH-LR-416 ..... N85-26683 #
VTH-LR-417 ..... N85-26954 #
VTH-LR-422 ..... N85-27281 #
VTH-LR-423 ..... N85-26933 #
VTH-LR-424 ..... N85-27282 #
VTH-LR-425 ..... N85-26984 #
VTH-LR-427 ..... N85-27647 #
VTH-LR-428 ..... N85-27167 #
VTH-LR-429 ..... N85-27615 #
VTH-LR-432 ..... N85-27283 #
VTH-LR-433 ..... N85-26985 #
VTH-LR-434 ..... N85-26986 #
VTH-LR-436-PT-1 ..... N85-27198 #
VTH-LR-438 ..... N85-26919 #
VTH-LR-442 ..... N85-27622 #
VTH-LR-443 ..... N85-27009 #
VTH-LR-444 ..... N85-26920 #

VTT-18 ..... N85-27276 #
VTT-320 ..... N85-27668 #

WAESD-TR-84-0026 ..... N85-27382* #

WHOI-85-6 ..... N85-27505 #

WJSA-R85T-03 ..... N85-27211 #

Y/DL-759-REV-1 ..... N85-27540 #

Y/DV-399 ..... N85-26977 #

Y/DW-480-REV-1 ..... N85-26951 #

YALEU/DCS/RR-349 ..... N85-27598 #
YALEU/DCS/RR-350 ..... N85-27706 #
YALEU/DCS/RR-352 ..... N85-27571 #
YALEU/DCS/RR-357 ..... N85-27172 #
YALEU/DCS/RR-363 ..... N85-27641 #
YALEU/DCS/RR-368 ..... N85-27556 #

☆ U.S. GOVERNMENT PRINTING OFFICE: 1985-461-597/20015

FEDERAL DEPOSITORY LIBRARY PROGRAM

The Federal Depository Library Program provides Government publications to designated libraries throughout the United States. The Regional Depository Libraries listed below receive and retain at least one copy of nearly every Federal Government publication, either in printed or microfilm form, for use by the general public. These libraries provide reference services and inter-library loans; however, they are *not* sales outlets. You may wish to ask your local library to contact a Regional Depository to help you locate specific publications, or you may contact the Regional Depository yourself.

ARKANSAS STATE LIBRARY
One Capitol Mall
Little Rock, AR 72201
(501) 371-2326

AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Department
Montgomery, AL 36193
(205) 279-9110, ext. 253

UNIV. OF ALABAMA LIBRARY
Documents Dept.—Box S
University, AL 35486
(205) 348-7369

DEPT. OF LIBRARY, ARCHIVES AND PUBLIC RECORDS
Third Floor—State Cap.
1700 West Washington
Phoenix, AZ 85007
(602) 255-4121

UNIVERSITY OF ARIZONA LIB.
Government Documents Dept.
Tucson, AZ 85721
(602) 626-5233

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 2037
Sacramento, CA 95809
(916) 322-4572

UNIV. OF COLORADO LIB.
Government Pub. Division
Campus Box 184
Boulder, CO 80309
(303) 492-8834

DENVER PUBLIC LIBRARY
Govt. Pub. Department
1357 Broadway
Denver, CO 80203
(303) 571-2131

CONNECTICUT STATE LIBRARY
Government Documents Unit
231 Capitol Avenue
Hartford, CT 06106
(203) 566-4971

UNIV. OF FLORIDA LIBRARIES
Library West
Documents Department
Gainesville, FL 32611
(904) 392-0367

UNIV. OF GEORGIA LIBRARIES
Government Reference Dept.
Athens, Ga 30602
(404) 542-8951

UNIV. OF HAWAII LIBRARY
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948-8230

UNIV. OF IDAHO LIBRARY
Documents Section
Moscow, ID 83843
(208) 885-6344

ILLINOIS STATE LIBRARY
Information Services Branch
Centennial Building
Springfield, IL 62706
(217) 782-5185

INDIANA STATE LIBRARY
Serials Documents Section
140 North Senate Avenue
Indianapolis, IN 46204
(317) 232-3686

UNIV. OF IOWA LIBRARIES
Govt. Documents Department
Iowa City, IA 52242
(319) 353-3318

UNIVERSITY OF KANSAS
Doc. Collect—Spencer Lib.
Lawrence, KS 66045
(913) 864-4662

UNIV. OF KENTUCKY LIBRARIES
Govt. Pub. Department
Lexington, KY 40506
(606) 257-3139

LOUISIANA STATE UNIVERSITY
Middleton Library
Govt. Docs. Dept.
Baton Rouge, LA 70803
(504) 388-2570

LOUISIANA TECHNICAL UNIV. LIBRARY
Documents Department
Ruston, LA 71272
(318) 257-4962

UNIVERSITY OF MAINE
Raymond H. Fogler Library
Tri-State Regional Documents Depository
Orono, ME 04469
(207) 581-1680

UNIVERSITY OF MARYLAND
McKeldin Lib.—Doc. Div.
College Park, MD 20742
(301) 454-3034

BOSTON PUBLIC LIBRARY
Government Docs. Dept.
Boston, MA 02117
(617) 536-5400 ext. 226

DETROIT PUBLIC LIBRARY
Sociology Department
5201 Woodward Avenue
Detroit, MI 48202
(313) 833-1409

MICHIGAN STATE LIBRARY
P.O. Box 30007
Lansing, MI 48909
(517) 373-0640

UNIVERSITY OF MINNESOTA
Government Pubs. Division
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 373-7813

UNIV. OF MISSISSIPPI LIB.
Documents Department
University, MS 38677
(601) 232-5857

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812
(406) 243-6700

NEBRASKA LIBRARY COMM.
Federal Documents
1420 P Street
Lincoln, NE 68508
(402) 471-2045
In cooperation with University of Nebraska-Lincoln

UNIVERSITY OF NEVADA LIB.
Govt. Pub. Department
Reno, NV 89557
(702) 784-6579

NEWARK PUBLIC LIBRARY
5 Washington Street
Newark, NJ 07101
(201) 733-7812

UNIVERSITY OF NEW MEXICO
Zimmerman Library
Government Pub. Dept.
Albuquerque, NM 87131
(505) 277-5441

NEW MEXICO STATE LIBRARY
Reference Department
325 Don Gaspar Avenue
Santa Fe, NM 87501
(505) 827-2033, ext. 22

NEW YORK STATE LIBRARY
Empire State Plaza
Albany, NY 12230
(518) 474-5563

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Wilson Library
BA/SS Documents Division
Chapel Hill, NC 27515
(919) 962-1321

UNIVERSITY OF NORTH DAKOTA
Chester Fritz Library
Documents Department
Grand Forks, ND 58202
(701) 777-2617, ext. 27
(In cooperation with North Dakota State Univ. Library)

STATE LIBRARY OF OHIO
Documents Department
65 South Front Street
Columbus, OH 43215
(614) 462-7051

OKLAHOMA DEPT. OF LIB.
Government Documents
200 NE 18th Street
Oklahoma City, OK 73105
(405) 521-2502

OKLAHOMA STATE UNIV. LIB.
Documents Department
Stillwater, OK 74078
(405) 624-6546

PORTLAND STATE UNIV. LIB.
Documents Department
P.O. Box 1151
Portland, OR 97207
(503) 229-3673

STATE LIBRARY OF PENN.
Government Pub. Section
P.O. Box 1601
Harrisburg, PA 17105
(717) 787-3752

TEXAS STATE LIBRARY
Public Services Department
P.O. Box 12927—Cap. Sta.
Austin, TX 78753
(512) 471-2996

TEXAS TECH UNIV. LIBRARY
Govt. Documents Department
Lubbock, TX 79409
(806) 742-2268

UTAH STATE UNIVERSITY
Merrill Library, U.M.C. 30
Logan, UT 84322
(801) 750-2682

UNIVERSITY OF VIRGINIA
Alderman Lib.—Public Doc.
Charlottesville, VA 22901
(804) 924-3133

WASHINGTON STATE LIBRARY
Documents Section
Olympia, WA 98504
(206) 753-4027

WEST VIRGINIA UNIV. LIB.
Documents Department
Morgantown, WV 26506
(304) 293-3640

MILWAUKEE PUBLIC LIBRARY
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 278-3000

ST. HIST LIB. OF WISCONSIN
Government Pub. Section
816 State Street
Madison, WI 53706
(608) 262-4347

WYOMING STATE LIBRARY
Supreme Ct. & Library Bld.
Cheyenne, WY 82002
(307) 777-6344

National Aeronautics and
Space Administration
Code NIT-4
Washington, D.C.
20546

Official Business

Penalty for Private Use, $300

SPECIAL FOURTH-CLASS RATE
POSTAGE & FEES PAID
NASA
WASHINGTON, D.C.
PERMIT No. G 27

9 1 STAR, 850731 S00606HU
UNIV OF MICHIGAN
ENG TRANSPORATION LIBRARY
ATTN: SERIALS UNIT
312 UNDERGRADUATE LIBRARY BLDG
ANN ARBOR MI 48109

NASA

POSTMASTER: If Undeliverable (Section 158
Postal Manual) Do Not Return